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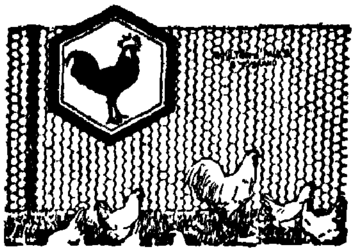
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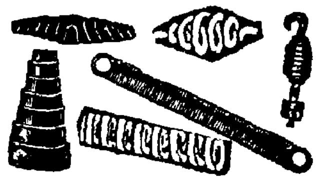
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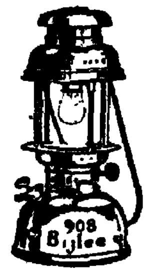
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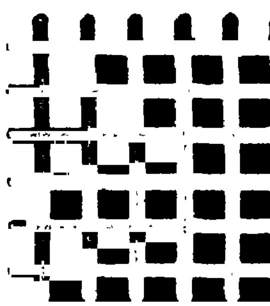
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Industry

EDITOR:
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THE CENTRAL BUDGET.

DR. MATHAI'S Budget for the year 1949-50, will be received with mingled feelings of hope and despair by the general public. But viewed in complete detachment, it unmistakably shows the stamp of practical wisdom and insight. And we are of opinion that save certain minor adjustments, here and there, the Budget may be accepted in principle.

The total impression is, surely, one of hope for the future. And we think, there is substance in Mathai's claim that but for the special demands, e.g. Defence Expenditure and Relief, the Budget would have shown a substantial surplus.

In the Budget for the year 1949-50, the total revenue has been estimated at Rs. 307 crores, allowance being made for reduction in receipts for customs corporation taxes. The total expenditure has been estimated at Rs. 322 crores revealing a deficit of Rs. 15 crores. This figure has been raised to 20 crores by the various taxation relief proposals. From an analysis of the various taxation relief proposals and other new features it will be evident that Dr. Mathai has taken full cognisance of the fundamental principles of the fiscal policy and has persistently endeavoured to achieve the twin objects e.g. anti-inflationary drive and increased production. Since the very inception the National Government have been fighting tooth and nail against these allied, disconcerting problems of inflation and declining production which have been baffling all genuine endeavour of stabilisation of economy and seriously defeating our primordial object to bring about an improvement in the living standards of common man. It is significant, therefore, that while on the one hand he is in favour of encouraging increased production by such incentive measures as abolition of capital-gains tax, concessions and relief in income tax, depreciation allowance at double the rates for new plant and machinery and extra-depreciation allowance for existing plant and machinery, on the other hand he proposes to draw off the surplus purchasing power by imposition of additional duties on luxury articles.

(Continued on page 2)

Current Topics

FREE EXPORT OF HAND-LOOM CLOTH.

The Government of India recently permitted free export of handloom cloth and thus gave it the much needed relief and *encouragement.* A dispassionate study reveals that present conditions warrant no need of restrictions on export. We may have no objection in the free export of commodities of which we have a comfortable surplus and which do not in any way affect the internal market and living condition of our countrymen.

But while allowing this temporary liberalisation of exports and recognising the importance of this export trade, the Government of India give priority to our internal need and requirements. They consider that the hand loom industry must in future so arrange its production so that it will play a long part in meeting our domestic requirements. The industry therefore has been asked to change the character of their production.

But we have grave doubts, how far Government's proposal may be carried into practice firstly because the hand loom weavers have been especially trained and the industry has been so organised as to meet the export demands. Certain sections of the industry have especialised in the production of fabrics, e.g., handkerchiefs, Lungis, which are consumed only in overseas countries. Secondly because it is not possible for the hand loom to compete with the mill product even though they begin production of those varieties of cloth, suitable for consumption in the home market. So if this industry has to survive in the face of severe competition, it has the sole means of survival in export to the overseas countries.

We hope, Government will take a sympathetic view of things and will give it all possible relief and encouragement.

The Fact Finding Committee (Hand loom Mills) pointed out that lack of publicity and propaganda in foreign countries was the gravest defect of the entire export trade. Besides no agency is there to protect and safeguard the especial interest of the hand loom industry. So we strongly feel that this, lacunae should be removed in the quickest possible time and particular attention should be devoted to propaganda and publicity.

INDUSTRIAL PLANNING.

Sri M. Visvesvaraya in his address at All India Manufacturers' Organisation

(Continued from page 1)

The contemplated reliefs, concessions and changes obviously come out of a feeling of urgency to remove fear, revive confidence and create a wholesome psychological atmosphere for saving and investment in productive enterprises of the country and thus eventually raise the living standard of the common man.

We hope, Government's confidence in private enterprise has not been misplaced. And it may be also reasonably hoped that the aforesaid measures will provide sufficient incentive to individual and private enterprise who, out of an appreciation of the anxieties of the Government, should therefore pool all their resources and energy to their own benefit as well as to the larger interests of the country.

made a comprehensive survey of the economic problems facing the country to-day. He spoke some home truths and exposed with his characteristic insight the illusory veil of progress. His contention is based on solid facts and figures and is therefore incontrovertible. A dispassionate study leaves no room for cosy complacency, but calls for vigorous initiative and activity. The general impression is one of gloom. How can we feel complacent while a large number of illiterate peasantry remain in the morass of poverty and ignorance, seems to be entire the burden of his address, and his address always revolved round the central theme—uplift in the general standard of living.

The practical suggestions, embodied in this address, bear the unmistakable stamp of a creative and virile mind. And, if implemented, they will, we believe, yield tangible benefit, to the country's material and moral progress.

The immediate task, he emphasised was to raise the agricultural and industrial output of the country. But that will scarcely help us unless a general advancement in technical education, synchronises with increased agricultural and industrial output.

In his survey he takes cognisance of the essential requirements as well as the main hurdles, that are hampering the steady and smooth progress of the industrial development. Amongst the machinery requirements for increased production drive, he cited automobiles-hydro-electric and other power machinery which have to be manufactured here. He regrets that government does not seem to realise its vital and urgent importance as evidenced in the absence of any plan or programme and a complete absence of a budget grant.

In spite of these difficulties, drive for increased agricultural and industrial production remains a feasible proposition. He outlined a well-defined and clearcut scheme and opined at least a provision for 400 crores should be made annually for investment in industrial enterprises of which 100 crores should be by Provincial and Central Governments.

Visvesvaraya emphasises that a drive for increased production must have the war-time urgency and tempo. Sir Visvesvaraya says capital for industries should be raised by intense effort to obtain a loan of at least Rs. 1000 crores within the country by paying a high rate of interest and another Rs. 1,000, crores from America.

PROGRESS IN JUTE RESEARCH.

In his address at the Annual General Meeting of the Indian Jute Mills Association, Mr. M. P. Birla, the Chairman of the said Association revealed that appreciable improvement has been attained in jute research work. As a matter of fact this is the only course open to it for consolidation of its stable position in world markets. Events are fast moving. And recently we watched with grave concern the increased menace of substitutes and an organised attempts to overthrow it from its traditional monopoly position.

Mr. Birla expressed his firm conviction that if this steady progress in jute research was maintained, Indian jute should be able to compete the threat of substitutes and hold its own in the packaging field of world industry and commerce. Birla's conviction has its basis in truth and is born out of an appreciation of the concrete achievements of the research organisation.

We, then have ample grounds to believe that Indian Jute Mills Association are carrying on their work with the needed efficiency and energy. The technical service section, in particular, constitutes an indispensable part of the organisation. And we have to admit they have shown

satisfactory work in the meantime. The main function of this section is to harness the fruits of science and technology to practical and creative ends. Provision has been made for advanced training in such technical subjects as mill processing. The ultimate subject is to form a band of technical officers, who may carry on periodic supervision and tackle the various technical problems. The various surveys relate to the preparation and application of batching emulsions, the sizing for jute, warps, water supply.

Among other activities of the research institute mention must be made of the appointment of a special sub-committee to deal particularly the subject of excess moisture which has been costing the industry enormous sums of money every year. It is expected that these will considerably reduce and eventually eliminate this huge wastage of money.

All these varied activities in the sphere of research invariably tend towards the attainment of the single objective e.g. increase of efficiency and reduction of costs. The problem of jute therefore is both economical and technical. And it is only by means of solution of both these problems, that the position of jute in world market can be stabilised and threat of substitutes can be effectively warded off.

WEST BENGAL BUDGET.

A scrutiny of West Bengal Budget shows signs of steady recovery and the total impression is not surely one of gloom and despair. The Budget for 1949-50 presented to the Provincial Assembly on the 24th February, discloses a deficit of Rs. 110.91 lakhs, as compared with that of Rs. 21.26 lakhs according to the revised estimates for the current year. Revenue receipts for the budget year are estimated at Rs. 31.83 crores as against an expenditure of Rs. 32.93 crores. In the current year revenue receipts and expenditure are expected to amount to Rs. 30.58 crores and Rs. 30.82 crores respectively.

And the revenue deficit of Rs. 110 lakhs, referred to above is sought to be covered from out of a yield of Rs. 80 lakhs under sales tax and income Tax and Rs. 20 lakhs from entertainment tax. Proposed taxation over daily necessaries of life e.g., mustard oil, matches, quinine has provoked criticism from a large section of assembly members. We hope Government will respect the genuine feelings and sentiments of these critics, particularly the masses and make suitable adjustments and compromises which will, we hope, smooth matters considerably.

Anyway the very prospect of balancing the budget shows prospects of its recovery from its usual ruinous tendency towards bankruptcy and it may be reasonably hoped that a gradual reformation, readjustments and increased discrimination in expenditure in such items as police Administration and an increased diversion towards development schemes will help immensely the development of a healthy Provincial finance.

One of the notable features of West Bengal Budget is that Government has no public debt funded or floating. If debt to the Central Government will stand at Rs. 882 lakhs this is expected to go up to Rs. 2,483 lakhs by the end of 1949-50. The increase is due to loans on account of productive development schemes such as the Damodar Valley Project, Grow more food schemes, Calcutta State Transport scheme, advance to refugees.

All these problems are of vital importance and don't brook further delay. Loans have to be incurred in their account if they are indispensable.

On the receipt side, we note with regret that regarding re-allocation of the net proceeds of income tax West

Bengal has not received the attention that is due to it. West Bengal will receive only 12 per cent. of the total Provincial income tax as against 20 per cent. only and the share of jute duty allocable to the Provinces will be reduced from 62½ per cent. to 20 per cent. only. Allocation of a due and reasonable share would have considerably improved the financial budget.

Mr. N. R. Sarkar, the Finance Minister has presented his Budget, with a general background of the deterioration economic situation in the country and he suggests that borrowing from foreign capital may go a long way to ease the situation, stimulating productive enterprise as well as economic advancement of the country.

PROSPECTS OF THE SUGAR INDUSTRY.

The sugar industry is now our second largest national industry and represents an investment of Rs. 35 crores, and finds employment for no less than 3000 university men and 1,30,000 unskilled workers, has stopped the drain of about Rs. 15 crores per annum with the practical cessation of sugar imports.

Now that we have realised the gravity and importance of this industry efforts should be now concentrated on the expansion and development of this industry. A critical analysis reveals certain chronic drawbacks and defects which seriously hamper its development and progress. The crux of the problem lies in improvement in cane cultivation in respect of yield per acre, by bringing it to the level of at least 40-50 tons per acre, for the whole country in place of the present low acreage. Expert opinion indicates that this is quite possible and efforts should therefore be made for achieving a higher yield per acre, particularly in the sub-tropical areas like the U. P. and Bihar where the acreage is very low. The drive for increased yield must necessarily be scientific and systematic. The first method that may be adopted fruitfully for this purpose is application of manures for nutrition of soil. Secondly, the factories also may help immensely that way. The principal cause of the present low yield of sugar from cane in India lies in the fact that the factories to-day crush bulk of the cane when it is not fully mature. This can surely be remedied by the factories encouraging the growth of early ripening, mid-season and late ripening varieties. This would surely yield higher recovery, enable the extension of the crushing season to at least 180 days in the year in place of the present 100 days. And this would consequently result in reduction of the cost of manufacture.

The above facts conclusively show that sugar industry has immense possibilities of development in future.

Recently there has been a good deal controversy regarding the desirability of protection being continued further. A considerable section is of opinion that sugar industry has still a favourable case for protection in as much agriculture in India is still at a very low level of development. And unless a comprehensive research policy is undertaken with regard to yield of cane with the final aim of reducing the cost of manufacture, it will be impossible to hold its own against foreign competition.

PROBLEMS OF RAILWAY TRANSPORT.

Railway transport is vitally and intimately related to the economic prosperity of the country as a whole. Any mal-ad justment is sure to produce repercussions in the whole national economy of this country. These maladjustments, in the final analysis, are due to deficiencies in essential requirements. That Government are quite aware of it, is evident from revelation in the Budget speech. In course of his Budget speech, Mr. Ayenger

produced an array of statistics of orders, placed for locomotives, boilers, and wagons. It is revealed that upto December last, the Railways have received a supply of 2359 wagons. By March an additional 485 wagons will be available. Orders for 863 new locomotives have been issued in U.S.A., Canada, England and France. Of these, 52 have already arrived by 15th January. By the end of March arrival of 120 locomotives are expected. We have thus definite proof that the Railway Department are sincerely endeavouring to tackle these grave problems. But it will not suffice for them to bridge up the gap by mere supplies from foreign countries. In order to bring about a permanent stability and prosperity of the railways, it is necessary that these essential requirements should be manufactured here in India. Of course efforts are already being made in this direction. But the rate and speed of actual progress, we apprehend, have not attained the desired tempo. According to available information a locomotive factory is going to be set up in the neighbourhood of Mihijam and will begin to operate from 1950 and since 1951 we will have an annual supply of 120 locomotives and fifty boilers. But that will scarcely meet our tot~l demand.

Construction of locomotives in this country should be sped up from two main considerations. Firstly, procuration of locomotives from outside is a difficult affair. Secondly, purchase of whatever is available involves drainage of our dollar resources.

We hope, Government will take cognizance of this fact and take necessary measures.

LEATHER AND LEATHER GOODS MANUFACTURE.

LEATHER has at all times been indispensable to the human race. No substance equals it for the construction of articles for personal use. Its attractiveness, its adaptability, its flexibility, resiliency, and general wear-resisting properties have earned for it the centuries old reputation, "nothing like leather." Its earliest applications were of clothing, boats, bottles, manuscripts, sandals, harness, etc. In modern times it is put to multitudinous purposes, for example, for making boots and shoes, gloves, leather clothing, machinery, belting, military equipment, upholstery, bookbinding, and surgical appliances.

These diverse applications of leather have put some idea into imaginative power of man to find out some substitutes for leather and in this direction an immense progress has been made resulting in the manufacture of artificial leather and plastics. (This, however, is not because the substituted materials are superior but because the supply of leather is limited). Consequently, to meet the demand for the articles, manufacturers have had to make use of substitute. But leather goods ar always in demand, and induce a feeling o pride and respect on the part of the owne which is seldom entertained for the substi tute.

The making of leather goods is a craf which in its better forms requires a higl degree of skill and application on th part of the worker. The demands mad upon its different branches depend to large extent on the prevalent trends o fashion in dress and upon the manners an customs of people. Each year brings nev designs and styles to the forefront, thoug occasionally one sees a revival of a pas age.

In manufacturing processes, howeve no great change has been evolved, nor ca this be expected in an industry in whic the manufactured articles are so divers and everchanging. The introduction of machine to simplify manufacture has a intervals created some reorganisation o method, but with these exceptions leathe goods are still made at the work bench b men and women skilled in their employ ment.

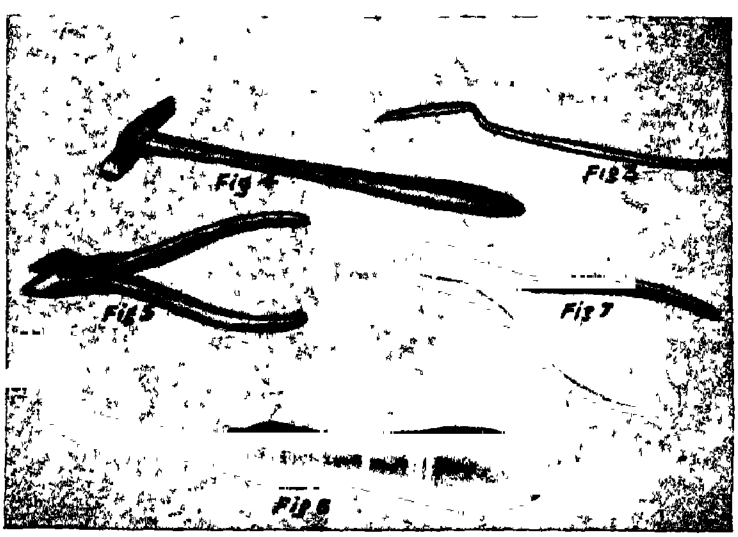


Fig. 1. Tools.

In the following pages the various processes common to the manufacture of most varieties of leather goods have been explained at some length, with the object of helping the learner who intends to make the trade a means of livelihood.

While considerable attention has been devoted to details of construction, it should be remembered that leather itself is a very variable substance, differing from skin to skin. Some leathers are soft and supple, others harsh and stiff; thin leathers, thick leathers, firm leathers, stretchy leathers, are all met with, and so it is difficult to lay down hard and fast rules.

PRODUCTION OF LEATHER.

In India the production of leather may be broadly divided into two classes, viz., finished and unfinished leather. The finished leather comprises sole-leather, belting leather, saddlery, harness and strap leather, upholstery, boot and shoe upper leather, etc. Under unfinished leather on the otherhand, fall the bag tanned buffalo hides and the half tanned hides and skins. The former one used in the country as sole leather and the latter exported to foreign countries.

A brief description of the various types of leather together with their specific applications are given below:—

SOLE LEATHER.

Since most of the tanneries in India are equipped with up-to-date machineries they are turning out well-finished articles. The output of this kind of leather is fairly large and is increasing year after year. A portion of it is used for the soles of ammunition boots and the remaining is consumed in making shoes and other useful articles for railway and industrial concerns.

TRUNK, SUIT-CASE & BAG LEATHER.

,These are made mostly from cow hides, the superior grades from the spread hides of good substance and the inferior ones from the smaller cowhides, sheep and goatskins. They are dyed or stained into different shades and embossed with attractive designs.

BOOT & SHOE UPPER LEATHER.

This type of leather is produced by chrome tanned calf leather so as to make the leather soft and supple. In chrome tanning the mineral matter percolates the

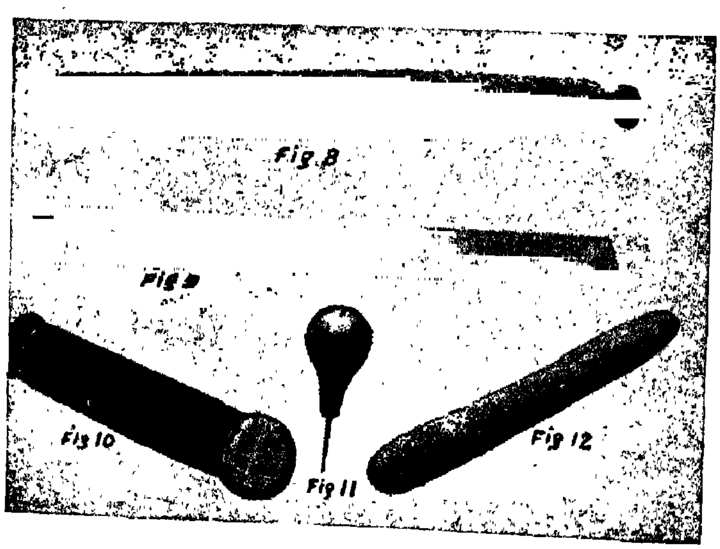


Fig. 2. Tools.

skin much more quickly so that in all the modern tanneries chrome process is mainly carried out in the preparation of this type of leather.

BELTING LEATHER.

In producing belting leather selected buffalo hides are indispensable and they are tanned in the same way as sole leather. In finishing, a certain amount of grease is incorporated to impart the required pliability.

HARNESS, SADDLERY AND STRAP LEATHER.

The heavier types of this class are made from buffalo hides and the lighter grades from thick cow hides.

UPSOLSTERY LEATHER.

A start has been made to manufacture it in India and incentive has been given to this branch of manufacture by the bus traffic. As it lasts longer than leather cloth bus seats are generally covered with leather.

BOX HIDES.

These are an important variety of some upper leather manufactured from cow hides by chrome tanning. The Indian cow hides form a suitable raw material for this leather and a large proportion of the East Indian kids exported to foreign countries are turned into this variety of leather.

GLACE KID.

This is another superior type of shoe upper leather. It is made from goat skins. Until recently this kind of leather was mainly imported from U.S.A., who used to buy raw skins from India and sent them back as finished product. Now successful attempts have been made by a few tanneries to produce skins of superior quality.

PICKING BANDS AND LACES.

Buffalo hides are also chrome tanned and stuffed with grease to make picking bands for the textile looms. As yet the bulk of the packing bands used in India is imported from abroad, value of the annual import amounting to about Rs. 8 lakhs. There is, therefore, a good scope for the manufacture of this article in India. Chrome tanned thin buffalo hides or thick cow hides made sufficiently pliable by incorporation of grease make excellent laces for machine belts. A fairly large amount of laces is at present made in India and used in the various mills.

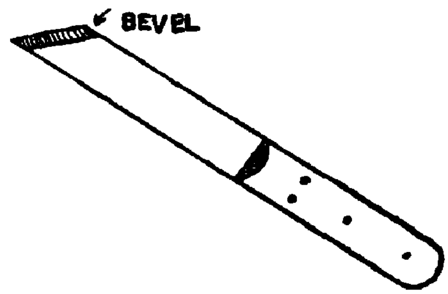


Fig. 3. Paring Knife.

UNFINISHED LEATHER.

Under this class fall the bag tanned buffalo hides and the half tanned hides and skins. The former one used in the country as sole leather and the latter exported to foreign countries.

The production of bag tanned sole leather is extensively carried on by the indigenous method. This becomes very popular among the shoe makers of India.

The tanning of half tanned hides and skins are generally performed in Madras and Bombay, where cow hides, light buffalo hides, goat and sheep skins are extensively tanned. The tannage is not thorough and hence the products are usually called half tanned. They form a very suitable start material for the European carriers, who after giving them a further tannage finish them into various classes of useful leather.

DIFFERENCE BETWEEN HIDES AND SKINS.

Untanned skins of big animals such as cow, buffalo, horse, etc. are called hides

and those of smaller ones such as goat, calf, sheep, pig, etc. are called skins.

PRESERVATION.

The fresh or green skins as obtained are first preserved before subjecting them to tanning process. There are three ways of preserving skins, viz:—

(i) Wet-Salting—This should be adopted when hides and skins are intended for short-time preservation. Common salt and for summer preferably sea salt should be rubbed twice or thrice on the flesh side of hides or skins. Water will come out after some time which should be left out by hanging.

(ii) Dry-Salting—This method should be adopted when hides or skins are intended for long-time preservation. The flesh sides should be rubbed with sea salt and the process should be repeated twice or thrice.

(iii) Drying—Hides and skins should be stretched length-wise on bamboo frames and dried up in the sun. If they are dipped in a solution of arsenic with water then ravages of insects etc. can easily be avoided. This method is generally adopted when hides or skins are intended for export. The village chamars also resort to this process to make preservation cheap.



Fig. 4. Cutting Knife.

TANNING HIDES AND SKINS.

The substance known to us as leather is actually the preserved form of the natural skins of animals being converted to that condition by a process of tanning. There are two distinct methods of tanning—the vegetable tanning process and the chrome or mineral tanning process. Vegetable tanning consists of treatment of the limp flacid, raw skin, with extracts obtained from certain forms of vegetation, and the chrome method employs a salt of chromium and render the fibrous structure permanent. Leather produced by these methods is considerably different in character. The vegetable tannage produces a close, but not necessarily harsh textured leather, while chrome-tanned leather, is of a more springy nature and rather empty in substance owing to the spaces between the fibres are not filled with surplus tanning matters as with vegetable leathers.

There is yet another method producing light types of leather from skin known as towing. This must not be condensed with tanning, as the resultant product is chemically different from tanned leather, nor is it permanent to the same degree. In tawed leather the skin fibres are impregnated with salt and alum to produce very white soft leathers and with oil and albumen to produce coloured soft leathers.

Now let us proceed to deal in details all the three processes; but before doing so we have to discuss the preliminary operations which are absolutely necessary preceding to actual tanning process.

PRELIMINARY TREATMENTS.

The hides and skins as arrived in tanneries are not directly used for tanning; but they may be subjected to various preliminary treatments such as soaking, unhairing, liming, trimming, fleshing, deliming, bating or puering and pickling, each of which is described here briefly.

SOAKING.

The first major operation carried out on the cured salted hide or skin is termed "soaking". This process is of great importance, for if it is improperly performed, the final leather will usually be defective.

The salt-cured or dried skin contains less than its physiologic water content; it

contains proteins which were originally in a liquid state but are now partially dried and often coagulated; the salt-cured skin contains salt; and its outside surfaces are covered with more or less extraneous matter and filth, together with many bacteria. The objects of soaking are: to rehydrate the skin proteins; to partially solubilize and remove the denatured dissolved proteins; to open up the contracted fibrous structure of the skin; to remove the curing salt in the case of salted skins, and to clean off surface filth. The cured skin contains many proteolytic bacteria. These are held in check by the presence of curing salt or, in the case of dry unsalted skin, by the absence of free water. When the restraining influence are removed and when conditions become favourable for bacterial growth, bacterial digestion of the skin commences.

Hence, the soaking of dry hides and skins presents a special problem to the tanner. Mere soaking in cold water is not enough because of the great length of time required and the consequent danger of bacterial attack, with slight dispersion of the dried coagulable proteins. As a result of this, the collagen fibres are unable to swell and open properly. The addition of acids or alkalies, or of sodium sulphide, to the soak water to expedite the skin's hydration has not proved satisfactory. Soaking sun-dried goat skins or dry hides in a sufficient concentration of sodium chloride for 24 hours and then transferring them to fresh water for another 24 hours will result in satisfactory and uniform hydration and a greatly increased removal of coagulable proteins. This method of soaking has been used advantageously by tanners of both dry goat skins and dry hides. Salt soaking is also being successfully employed by tanners of salt-cured hides.

However, it is not feasible to formulate specific rules for all types of soaking, since conditions, processes, and desired leather qualities vary. But it is now generalh recognised that soaking bears very directly upon the behaviour of the hide or ski in the subsequent processes through whicl it must pass, and upon the quality an quantity of the final leather product.

UNHAIRING.

There are two general methods o removing the hair or wool, first, paintin with alkaline sulphides and lime, second immersion in a strong sulphide solution For sheep skins, painting is usually th method preferred as it enables the wool t be kept clean and in good condition. Afte soaking it is usual to beat woolskins witl a plunger pole and to brush the wool so a to remove all filth. These operations ar then followed by soaking in clean wate and hydro-extracting. As the wool hold a tremendous amount of water the skin should be allowed to drain for severa hours before extracting. The best way t fold the skins is down the middle of th back, flesh in, and the number of skin depends upon the dimensions of th machine, size of skins and amount of wate present. It is useless to give any definit time required for hydro-extracting an only the man in charge really knows th most suitable time. On no account mus the skins be too dry before painting other wise it will be found that the depilator will work unevenly.

Cages made of Monel metal, stainles steel and vulcanised rubber-coated stee are all suitable for general work.

When the skins are taken out of th hydro-extractor all the creases should b taken out and the goods stacked up in low

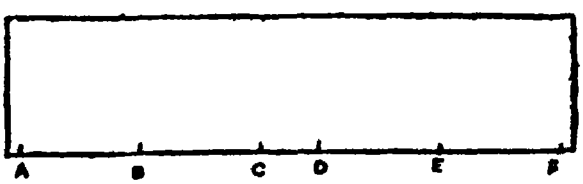


Fig. 5. Marking The Bends.

piles ready for painting. It is suitable to have the folded skins lying about for several hours before shaking out the creases as this may mean the formation of permanent wrinkles.

The simplest way to make a depilatory paint is to mix hydrated lime, slaked lime (carefully sieved) with enough sodium sulphide solution (26°Tw) to make a smooth working paste. The skins should be laid out on a rough table and painted with a brush. Care must be taken to prevent the wool being smudged with the depilatory and badly damaged. When painted, the skins need doubling up down the black and then stacking in piles and leaving for 12 to 24 hours.

Depilatory action is always quicker and cheaper if it can be carried out by immersion in a strong sulphide solution, but this method is not practicable if the hair is of any value. A depilatory lime may contain from 1 or 2 per cent. sodium sulphide and 3 to 5 per cent. lime on the hydro-extracted weight of stock. The best plan is to slake the lime in a pit by just covering it with sufficient water to enable it to work vigorously over a period of 12 hours. At the end of that time the desired volume of water should be added and the liquor well plunged up. The skins should be thrown into the liquor one by one and pushed under the surface with a long pole. Some tanners allow the goods to remain for 6 hours for drawing, others only 2 hours, but all manner of variations are

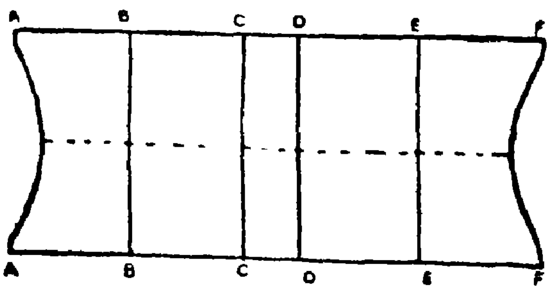


Fig. 8. Pockets Turn Over.

capable of good results. In the case of calf, kids and light hides, it is advisable to add a further amount of sulphide after the firt draw, about one quarter of one per-cent should prove sufficient. At the end of 24 hours the hair or wool will generally rub off very easily either by hand or machine.

LIMING.

After depilation comes liming. A good quality lime will do its work well without any assistance in the case of ordinary goods but for impoverished and badly cured goods it is recommended to sharpen up the limes with a little sodium sulphide or soda ash. Only a small percentage of lime is soluble in water but it is essential to have sufficient to replace the lime absorbed by the skins. Four percent on the extracted weight of the skins allows a large margin for replenishment, and 2½ per cent should prove sufficient provided the liquors are not exhausted by being too long in use.

The action of lime is to swell the fibres, remove the epidermis and certain substances between the fibres. Excellent results can be obtained from a three pit liming system, the first being a mellow lime, second, a medium, and third, a fresh, sharp lime. After once working round, the first is run off and becomes the new lime; then the second, the mellow and the third, the medium lime. There is no hard and fast rule for liming as everything depends upon the kind of goods to be worked and the type of leather to be produced. Sheep skins for splitting require a good sharp liming to produce a firm pelt for the hand knife machine, and this means that time in mellow limes must be curtailed to a minimum. On the other hand, gloving leather and clothing leather are best worked in fairly mellow limes containing a little sulhide. Calf for box and willow generally do well in a short system of medium and sharp limes, and goat skins for glace kid in the longer and milder working ones.

A great deal of the success of liming depends upon the agitation of the liquors and the handling of the goods. So, instead of prolonging the period of liming, better results can often be obtained by employing more scientific methods of agitating either the goods or the liqour, preferably both.

After liming the goods are put into sacks soaked in lime to drain off the liquor.

TRIMMING.

This preliminary operation is carried out by hand and it is very important to the tanner that the workers should be really skillful. The offal must be cut away but at the same time the shape of the skin has to be made neat and presentable. If the worker uses his knife too freely there will be a heavy loss to the manufacturer. Waste of two or three square inches on every skin soon mounts up when multiplied by thousands.

FLESHING.

This is usually done by machine. The skin is pressed flesh side up against a cylinder with spiral blades while on motion scrape off the flesh from the skin. It is always better to have a little flesh on the skin rather than have it too clean.

Fleshings from the machine contain a considerable amount of valuable fat and they can be boiled in vats and the grease recovered.

DELIMING.

This is necessary to remove the bulk of the alkali from the skin. For this purpose 5,000 lbs. pack of skins are put in a vat filled with 1,900 gallons of fresh water at 80°F. The pack will cause the vat to be filled to its full capacity. Have on hand a solution containing about 1 lb. of sulphuric acid to each gallon of water. Always the acid is poured into the water. Now the acid solution is slowly and cautiously added to the vat while the paddle is working. The amount of acid required to bring about the equilibrium should be estimated from time to time. This mainly depends on the amount of lime used. The time required to reach approximate equilibrium may vary from 30 to 90 minutes.

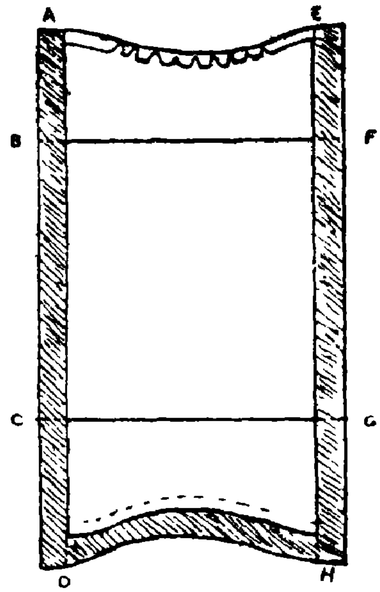


Fig. 7. Leather With Lining.

BATING OR PUERING.

After this deliming operation the skins are transferred to another vat for bating or puering, which we now describe.

Bating is the treatment of skins with the fermented excrement from the kennels. This is carried out by adding the bate into the vat containing warm water along with the skins. The correct quantity of bate judged from experience is made into a thin paste with warm water 98°F. and added to the paddle containing used bate liquor. The optimum temperature for working appears to be about 95°F for pancreatic enzyme bates, and perhaps a little lower for bacterial bates. Movement of the goods is necessary to effect even action of the bate and a paddle appears to be capable of more uniform and better results than is possible with a drum.

SCUDDING.

After puering the goods are generally scudded, either by hand or machine, to remove the pigment granules, wool or hair roots, dissolved skin rendered soluble by digestive action of the enzymes, and general filth. The object of scudding is to clean the skins thoroughly. Operation is performed by hand with a beam made of wood.

PICKLING.

This is a highly important preparatory process for tanning, especially chrome tanning, in which case the free acid in the skin plays a valuable part in controlling the action and absorption of chromium salts at the beginning of the process. Apart from practical considerations relating to tanning, either vegetable or mineral, pickling is important as a means of preserving the skin. During the ordinary pickling process using sulphuric acid and salt, the skins absorb hydrochloric acid formed by the reaction and the amount absorbed largely depends upon the concentration of salt in solution. In many cases, hydrochloric acid can be substituted for sulphuric acid and this is advisable when the goods are to be chrome tanned with basic chromium chlorides. According to well-known authorities, 1 per cent. sulphuric acid and 10 per cent. salt should be satisfactory when the ratio of liquor to goods is 6:1. When the ratio of liquor to goods falls, a higher concentration of acid and salt may be necessary, when the ratio is 3:1 about 1.2 to 1.5 per cent. acid and 12 per cent. salt would be a convenient concentration. Optimum concentrations for a pickle liquor after use are 0.8 per cent. sulphuric acid and 9 to 10 per cent. sodium chloride. A useful formula for pickling sheep skins is 10°Tw for the liquor before use containing about 1 per cent. sulphuric acid. Formic acid is also used and it gives excellent results and it seems particularly suitable for goods intended for high class fancy leathers. The presence of lime means that in the case of a sulphuric acid pickle, a form of lime-blast or precipitate of calcium sulphate is thrown down. Pickling with formic acid is best carried out in a drum as the minimum quantity of acid can then be used and the time considerably reduced. Proportions of 1 per cent. formic acid, 5 per cent. salt per 100 lbs. weight of limed pelt are recommended, but in general practice it is advisable to increase the proportion of formic acid to 2 per cent. on the limed weight for the best results. This formula gives excellent results if followed by paddle or drum tanning with sulphited quebracho and myrobalans, chestnut extract or sumac, and for leather calf it is highly recommended.

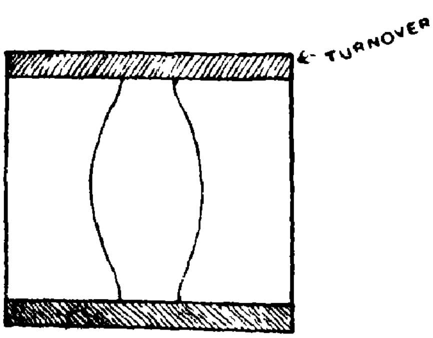


Fig. 8. Pockets Folded.

TANNING.

Now comes the actual tanning, which can be carried out in three ways, viz:—

1. Chrome tanning.
2. Vegetable tanning.
3. Alum tanning or towing.

Let us describe each of these processes in detail as far as possible with reference to some important hides and skins.

CHROME TANNING.

Without doubt, chrome tanning is one of the most important processes of leather manufacture. Roughly speaking there are two methods by which hides or skins may be chrome tanned:—

1. The single-bath process.
2. The two-bath process.

PREPARATION OF SINGLE-BATH LIQUOR.

Chrome alum	10	lbs.
Soda crystals	2¼	lbs.
Water	10	gal.

The chrome alum is dissolved in 4-5 gallons of water, stirring well to aid solution. The soda crystal is also dissolved in a separate quantity of water. This latter solution is poured slowly into the chrome alum solution with constant stirring and the liquor made up to 10 gallons with water. A pound or so of salt can be added if desired, as this tends to give a fuller and softer leather.

The above is for 100 lbs. of pelt.

Another formula is as follows:—

Sodium bichromate	3	lbs.
Hydrochloric acid	3	lbs.
Glucose	3	lbs.
Water	10	gal.

The bichromate is dissolved in 2 gallons of water and the acid added. When a clear solution is obtained, the glucose is added in small quantities at a time until the liquor, which is at first of a reddish-yellow colour, turns from an olive-green to a pure bright green colour. This will indicate that the reduction of chromic acid is complete. The colour is then made up with the rest of the 10 gallons water.

Instead of using hydrochloric acid, sulphuric acid may be used but its proportion should be 2½ lbs. instead of 6 lbs. of hydrochloric acid.

PREPARATION OF TWO-BATH CHROME LIQUOR.

In this method, two liquors are required, the chromic acid liquor and the reducing liquor. As examples of the chromic acid bath the following may be quoted.

Soda bichromate	5	lbs.
Salt	5	lbs.
Hydrochloric acid	3	lbs.

Water, convient quantity.

The above quantities suffice for abo[ut] 100 lbs. of pelt.

The reducing bath is as follows:—

I.

Hydrochloric acid	4	lbs.
Hypo	10	lbs.
Water	25	gal.

II.

Sodium bisulphite	5	lbs.
Water	12	gal.

METHOD OF CHROME TANNING.

Single Bath—For sole leather t[he] hides are suspended in the chrome liquor [in] pits. The liquor, which at the commenc[e]ment of tanning is very weak, is gradual[ly] strengthened by the addition of conce[n]trated chrome liquor as tannage procee[ds]. Light skins may be tanned in the paddle [or] drum.

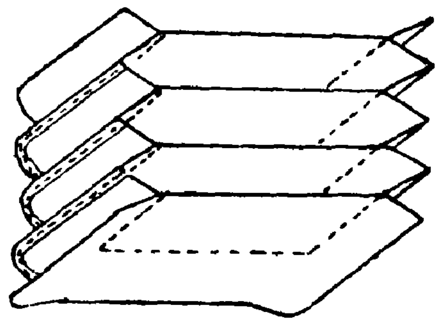


Fig. 9. Fastening Pockets.

Double Bath—Here again the suspe[n]sion method is used for the heavy class [of] hides, while for light skins the paddle [or] drum can be used. The goods enter t[he] first bath and are suspended or drumm[ed] as the case may be until they are stru[ck] through an even yellow colour. Th[ey] remain in the liquor for a still further sh[ort] period when they are removed and left [in] pile to drain overnight. The next day th[ey] enter the second bath where they rema[in] until reduction is complete and the leath[er] is of an even bluish colour. The actual ta[n]ning process is then complete, but as t[he] goods are still in an acid condition, th

have to be washed and then neutralised in a bath of a weak alkali such as borax, bicarbonate of soda, etc. From this point subsequent operations differ widely according to the class of leather being made.

FAT LIQUORING OR OILING.

If a stiff sole leather is desired, the fat-liquoring process is dispensed with. But prevent the grain from cracking it is advisable to oil up the grain even though no fat-liquoring was done. Before oiling up the neutralised leather is set out by hand. Then a coat of either neatsfoot or til oil is applied on the grain with a rag. Instead of oil an emulsion of oil in either soap or soluble oil (Turkey red oil) may also be applied on the grain. 2 parts of castor oil may be applied hot. The oiled up leather is piled grain to grain and left overnight. Next morning they are allowed to dry out after nailing on a board.

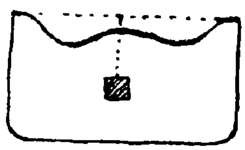


Fig. 10. Front Pattern.

WAXING OR STUFFING COMPOUNDS.

For chrome sole leather.

Resin	40 parts.
Paraffin Wax	25 parts.
Tallow	3 parts.
Carnauba Wax	1 part.

The paraffin wax, tallow, and carnauba wax are melted together and the powdered resin added. The whole is well mixed and heating continued until the mixture is clear and free from undissolved resin particles. It is advisable to keep the mixture well stirred during the process of dissolving. This should be applied to the leather now.

DYEING.

Dyeing is generally done before fat liquoring. For this purpose the dye is dissolved in hot water and it is strained through a clean piece of cloth. It is then dissolved in the dyeing bath. The hides or skins are run in it for some time. When the hides or skins absorb the dye totally, the bath is made more hot. The fatliquor oil is now added and the hides or skins are run in it for about half-an hour. Then the mordants (Gambier, etc.) are mixed in the bath and the hides or skins are run in it until the mordants are absorbed totally. Titox is then added and the bath is stirred for some time.

RECIPES FOR EVERY SEER OF PELT WEIGHT.

BLACK.

Extra Conc. or any other colour	6 as.
Fatliquor oil	1½ tola.
Castor oil	½ tola.
Logwood extract	½ tola.
Gambier	½ tola.
Soda	1 anna.
Titox	9 as.

OX-BLOOD.

Leather red OBR or any such colour	6 as.
Fatliquor oil	1½ tola.
Castor oil	½ tola.
Gambier	6 as.
Red dyewood extract	6 as.
Logwood Extract	6 as.
Titox	3 as.

MEDIUM BROWN.

Direct yellow R or and such colour 3 as. Acid phosphine phine R 4 as. Nut Brown D 1 anna	8 as.
Fatliquor oil	1½ tola.
Castor oil	½ tola.
Gambier	10 as.
Fustic extract	6 as.
Titox	3 as.

Dark Brown.

Nut Brown D. or any such colour	5	as.
Fatliquor oil	1½	tola.
Castor oil	½	tola.
Gambier	½	tola.
Red dyewood extract	½	tola.
or		
Red dyewood extract	3	as.
Loogwood extract	1	anna.
Titox	3	as.

White Chrome.

Turkey red oil	2	tolas.
French chalk	2	tolas.

Blue or Green.

Blue or Green Colour 6 to 10 as. Fatliquor oil 1½ tola, Castor oil ½ tola, Gambier 1 tola and titox 3 as. The object of fatliquoring is to make leather soft, stretchy and waterproof. Several commercial fatliquors are obtained in the market.

By the following process the Bengal Tanning Institute of the Government of Bengal prepare fatliqour and it is called by them as C. R. T. Fatliquor:—

Sulphonated castor oil	16	lbs.
Mineral oil (spindle oil)	1	lb.
Soft soap	4	lbs.
Castor oil	2	,,
Casein	4	oz.
Borax	½	oz.

A. Sulphonated Castor Oil is mixed with Spindle Oil.

B. Soft Soap is dissolved in small quantity of hot water and the Castor Oil is emulsified with it.

C. Casein is dissolved in the Borax solution by heating.

A, B and C are mixed in a barrel. The product can be stored for months without deterioration. 4 to 6 tolas on the shaved weight of leather should be used.

In place of Titox, 3 as. Ferrous Sulphate and 1 anna copper sulphate per seer of pelt weight should be used.

Drying, Setting, Damping, Staking and Nailing.

The hides or skins are now half dried in air or any exposing flesh side to sun. The flesh and hair sides are respectively set by brass stakers. They are then damped by being kept with wet sawdust bed. After damping they are staked lengthwise and breadthwise and when still damp, are stretched on board by nailing round the edges. They are dried out in this condition and taken off the board when dry.

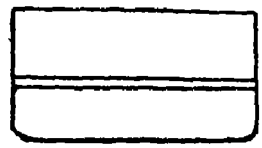


Fig. 11. Front Flap.

Trimming, Acid-Washing and Graining.

The edges are now neatly trimmed by a sharp hand knife. If the trimmed leather feels stiff, it may be re-staked in the dry condition. It is washed with either Lactic or Formic Acid to remove any grease that might have been left on the grain from excess of fatliquor. It is now grained by hand with a wooden grainer on the flesh sides.

Seasoning, Glazing and Finishing.

After graining the leather is seasoned. Egg polish should be prepared. The albumen of egg should be dissolved in water and beat up into froth, the dye and milk are then added and the whole substance is then strained through a clean piece of cloth. Finally the pigment and binder are added. The dye and pigment should be of same colour as of the leather. ½ seer of water, ½ tola of dyes, 1 tola of fresh milk, 4 tolas of pigment and 2 tolas of binder, ½ tola of Formaldehyde are required for one egg. This season should be applied with a brush on the grain side of the leather. It is then dried in air. Glazing is then done with glass slicker. In

case of cowhides the process of graining should be restored to once again. Now for final polishing shoe-polish should be applied with a soft brush on the grainside of the leather.

In case of white chrome leather seasoning is not necessary, but a small quantity of French chalk is applied on the hairside after shaving. If white chrome leathers are to be seasoned and polished, the general procedure may be followed with the exception of dye and by using white pigment. It is glazed with glass-slicker. French chalk should not be used if seasoning is done.

The season prepared from the albumen of one egg can easily paint one cow or such equivalent quantity of other hides or skins.

GLACE KID.

Goatskins are available in all parts of the world. Indian skins are usually considered the best, but the quality differs with districts and provinces of production. The preliminary processes of soaking, liming, deliming, pickling have already been described so there is no need of repeating them here. We simply describe the process of actual tanning.

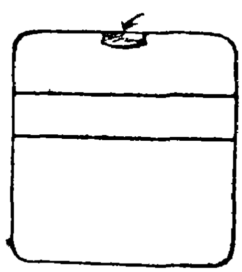


Fig. 12. Back & Flap in one Pair.

TANNING IN CHROME LIQUOR.

A double bath process is required for tanning Glace Kid The special bath is as follows:—

In the Chrome Bath sufficient water is taken to make a convenient float, 6 tolas of Sodium or Potassium Bichromate per seer of pelt weight is dissolved in a wooden vat. The solution is added to the tanning pit. 3 tolas of Hydrochloric Acid per seer of pelt weight is diluted with water and poured into the pit. The bath is now stirred. Skins are now put in and stirring continued for 3 to 4 hours. The skins turn yellow and they are taken out of the pit when the yellow colour is seen to have completely struck through by cutting a piece from the neck. The skins are now piled up with gunny cover as light is injurious at this stage.

Next morning the skins are put on a marble table with the flesh side up and set out by a brass-sliker for squeezing out the loosely adhering Chromic Acid from the skin and to remove wrinkles and fold marks from the grain. The pot skins are now passed through a dip bath one by one. The bath is prepared by 1 tola Sodium Thiosulphate, 1 tola Hydrochloric Acid and 2 tolas Common Salt per seer of skins. Sufficient quantity of water (2 tolas) is then added. The skins are immersed in the dip bath one for a second or two and then horsed up flat.

In the Reducing Bath sufficient water is taken. 15 to 20 tolas of Sodium Thiosulphate per seer of skins is dissolved in it and the solution is stirred. 8 tolas of Hydrochloric Acid per seer of skin is diluted with water. One third of the solution is added to the bath. Now chemical action between Sodium Thiosulphate (Hypo) and Acid will set in as will be seen from the opalascene of the solution and the smell of the sulphurous acid which will emanate. The dipped skins are now put into the bath and running continued for 20 minutes. after which the remaining portion of the acid is added and running continued again. The colour of the skins will change from yellowish to bluish green. Running is continued until the blue colour strikes through the thickest

part of the skins which can be seen by cutting a portion of the neck and examining the colour of the cut piece. The skins should be kept overnight in the reducing bath.

Processes from Shaving to Finishing are the same as in the case of manufacture of other leather.

VEGETABLE TANNING.

The delimed hides are tanned in the manner described below: For tanning a mixture of babul bark and myrobalans are most commonly used in Northern Indian. In Calcutta goran logs and bark blended with babul bark and myrobalans are mainly employed. A suitable blend is as follows:—

Babul bark	2	parts.
Goran bark	1	part.
Myrobalans	1	part.

The tanning may be done by any of the three methods bag method, layer method or liquor method.

BAG METHOD—This is an indigenous process not carried out in tanneries so we refrain from describing it.

LAYER METHOD—This is slow and rather wasteful. But where leaching facilities are not available, this is the only practical method that can be carried out.

According to this the hides are at first handled in an old weak tan liquor for 2 or 3 days just to colour the surface evenly. They are then laid in some stronger liquor with some crushed tanstuffs put between pairs of hides. The hides are handled on alternative days during the day and relaid with tanstuffs towards the evening. After a week the hides are given a fresh layer using more tanstuffs in which the hides are kept for a fortnight, handling and relaying once during the period. The hides are given a fresh layer after the fortnight, in this way the layers are removed until the tannage is complete.

LIQUOR METHOD—This is the mo modern method. According to this hid are at first suspended in weak liquors pits or suspenders. It is convenient to ha 7 pits in each of which the hides rema for 2 days. The strength of the suspen ers may vary for 5°Bkr. to 19°Bkr. fro tail to head suspender. Bkr. mea Barkometer.

From suspenders hides are taken in handlers of which a convenient number 14. The hides remain in each for 2 day The strength of the handler liquors increased by 2°Bkr. from pit to pit. Tl hides remain in handlers for a total peric of 28 days. Thus the strength of the hea handler is about 47°Bkr.

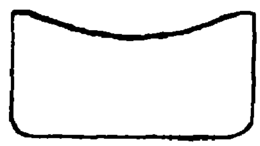


Fig. 13. Scallop.

The hides are next laid down layers of which a convenient number is Packs remain in each layer for 2 week Each successive layer must be strong than the preceding. Crush babul an goran bark and myrobalans blended in tl aforesaid proportions may be used f laying and the liquor must be obtaine from the strong hach. The completion tanning can be greatly accelerated. an the weight and the firmness of the leath improved by taking the leather from tl last layer pit and drumming them in strong extract liquor. A liquor of 50° 60°Bkr. may be used and the drum r volved slowly for 3 or 4 days. strengther ing the liquor at intervals with fresh add tions of extract. An addition of 1 to per cent. of Turkey red oil the weight leather accelerates the penetration of tl tanner into the leather. mellows down tl tannage and reduces the possibility of brittle or cracky grain.

FINISHING.

Tanned hides are washed and then scoured to remove the loose tan and bloom from the grain surface. otherwise hides dry up to an uneven colour and the setting too much bloom on the surface may make the grain cracky.

LEATHER FOR BAGS, TRUNKS, SUITCASES, ETC.

This leather is vegetable tanned and made from Cow or Bull hides. Soaking, liming and deliming are done as described previously so need not be repeated here.

TANNING.

After deliming the hides are hung in weak liquor in suspenders in which they remain about two weaks. The strength of the uspender liquors may range between 5° and 20° Barkometer.

Then they are passed through floaters in liquors from 20° to 35° for about 2 months and finally tanned out in handlers in stronger liquors of strengths ranging from 35° to 45° Barkometer. The hides remain in handlers for about a month. For heavier tannage the hides may be given one or two layers remaining in each layer about a fortnight.

Another method is to colour the delimed hides in drum in a liquor of 6° to 16° Barkometer, after which they are passed through floaters for 3 months in liquors ranging in strength from 10° to 35° Barkometer. The tanning is completed by handling in stronger liquors of 35° to 45° Barkometer for about a month more.

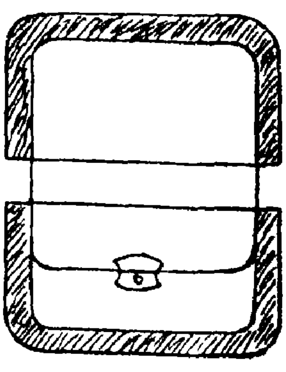


Fig. 14.
Top Edge of the Front.

FINISHING.

The tanned leather is taken out of the last liquor, washed in water, slicked off and hung up to samm. The hides are then shaved to an even substance, drummed and scoured by hand, using brush and slicker. They are then drummed for about 3 hours at 45°C in sumach, using either 1½ per cent. sumach extract on the weight of the leather, taken out, adhering sumach slicked off the flesh, the goods set out, lightly oiled on the grain with either sesame oil or fish oil, and hung up for samming when sammed they are taken down, dry spots are wetted back and the hides piled up to temper overnight. They are then reset with slicker on the grain and hung up to dry completely. The hides are now stained by brushing the desired dye solution in the grain. It is advisable to stain three times in order to get an even and full shade. The total quantity of dye which is to be used for a pack is divided into three portions, viz., ½, ¼ and ¼, half the quantity is dissolved to prepare the stain for the first coat and the remaining two quarters for the second and third coats.

The hide is laid perfectly flat on a smooth table. The first staining solution is brushed until the penetration is such that the flash side becomes evenly wet. The hide is then hung up and dried out. After this the second coat of dye is applied and dried up and the third coating is brushed and dried out.

TANNING REPTILE SKINS.

The Reptile skins comprise the skins of Snakes, Crocodiles and oval-grained yellow, round-grained Bengal black, small

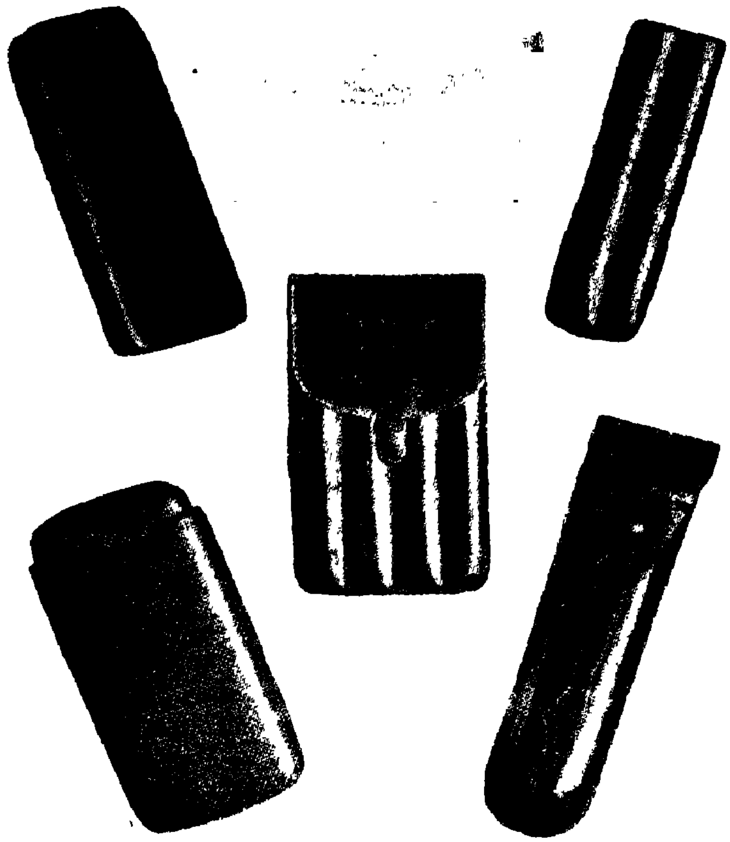


Fig. 15. Moulded Works.

and roung-grained U.P. and black and white Ramgodi lizards.

SOAKING AND LIMING.

Wet-salted skins are washed in 2 or 3 changes of water to remove the salt. If, however the skins are in the dried condition they must be soaked overnight. It is good to use 10 per cent. Borax solution for soaking specially in summer. The soaking should be continued till the skins are adequately soft.

Although reptile skins bear no hairs still they are to be limed. The object is mainly to remove the scales and to cause a swelling whereby the fibres are split and separated. It is usual to lime for 5 days in an old and 2 days in the new lime liquor. The scales loosened are removed by scraping off with a blunt unhairing knife. The removal of scales must be thorough as any scale left on the skins will show ugly. The skins are now well washed and kept in water overnight.

DELIMING.

½ to 1 oz. Boric Acid per seer of skins is taken. A bath is prepared by adding half the quantity of Acid and the skins are run in it for 15 to 20 minutes. The other half is then added and the skins are run in it for another 15 minutes. They are now washed in three changes of water.

TANNING.

Tanning is usually done by Turwar barks. The skins are first entered into a weak liquor for one day. Next day the liquor is strengthened by more barks and

skins are handled in it for 2 days. The liquor is daily strengthened and the skins are run in it for 11 days. The strength of the liquor is kept up by throwing up used barks and adding fresh barks each time. The tanning is now complete. The skins are taken out and washed. A medium strong myrobalan liquor is prepared and the skins are handled in it for 24 hours. After 24 hours the skins are taken out, washed and slicked.

After slicking the skins are oiled on the flesh side with sesame or groundnut oil. They are now dried in the shade. After samming they are staked. The dried skins are finally staked for softening.

BLEACHING.

Only skins of snakes and crocodiles are bleached at this stage. Bleaching bath should be prepared as follows:—

PERMANGANATE BATH—1 per cent. of Permanganate is cooled. The skins are thrown into the solution and worked for a short time (not more than 30 mins.). The solution is drained off and the skins are left exposed to air for some time after squeezing. The brown skins are then treated in the second bath.

BLEACHING BATH—Bisulphate of Soda 5 parts, 100 parts of cold water and 1¼ parts of Oxalic Acid. First the Bisulphate of Soda is dissolved in water and one-third of the Oxalic Acid previously dissolved in water is run into it. The skins are entered and worked for 2 to 3 minutes in the bath, they are taken out, another third of the Acid is run into the bath, the skins are re-entered, worked for 2 to 3 minutes, the skins are taken out again, final portion of the Acid is added and the skins handled again for 2 to 3 minutes. They are now taken out after being bleached. They are now ready for being coloured.

DYEING TO FINISHING.

Same as in the case of bark tanned bag leather, but drum dyeing instead of brush dyeing should be resorted to.

ALUM TANNING OR TAWING.

The use of aluminium salts for tanning dates back to ancient times, but they do not combine so readily with the hide protein as do chomic salts or vegetable tannins. Leather tanned with aluminium sulphate alone lacks many of the properties associated with good leather. For this reason it is sometimes called tawing and not tanning. In the tanning of furs, it is important that the hair retain its natural colour and not be discoloured, as it would be with vegetable tannins or with chromic salts.

A good method of tanning furs is to wash them, flesh them quite clean and then apply to the flesh side a paste made of aluminium sulphate, or common alum, common salt, egg yolk and flour. After these materials have penetrated through the thickness of the skins, they are dried slowly and aged for several weeks. Then they are washed to remove excess salt and coated on the flesh side with a paste made only of egg yolk and flour. They are then dried again and flexed to make them soft.

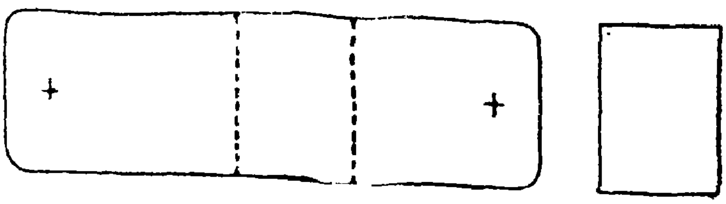


Fig. 16. Pattern Cutting.

Another useful process of preparing alum leather is as follows:—

The skins are well fleshed and then tumbled in running water (cold) for one hour. They are then bran drenched for 48 hours. Complete drenching is most important.

The drum solution is prepared by dissolving 100 lbs. alum. and 75 lbs. salt for every 100 lbs. pelt in warm water. 60°F., when the alum and salt are both thoroughly dissolved and the solution cooled down to 60°F the goods are thrown in the paddle and the latter run for half an hour. Tannage is allowed to take place in the still paddle for 2 days. At the end of that time the skins are taken out of the liquor and hung up to dry in a warm stove. When perfectly dry and hard, they are weathered for several days, the longer the better, then tumbled in a mixture of oatmeal. clay and stock alum liquor to form a thin paste. About 8 parts of oatmeal to 1 of clay are recommended. The drumming is continued until the skins are thoroughly softened. They are then hung up again in a hot stove well weathered and stacked in a heap for about a week. At the end of that period they are drawn through warm water and bundled up to season before staking. After airing off in a hot stove. they are again weathered, finally staked and buffed.

MOROCCO LEATHER.

The method of manufacturing morocco leather is quite old. Goat skins of large size are taken as raw materials The skins are soaked well to regain the softness of flesh skins. They are then limed first in an old lime liquor strengthened with a suitable quantity of sodium sulphide. About ½ per cent. of fused sodium sulphide on the soaked weight of the skins may be used. The skins are kept in it for 4 or 5 days, hauling and setting every day. They are then unhaired and put in a new lime for plumping up. In this the skins remain further 4 or 5 days after which they are fleshed and bated with an artificial bate such as pancreol, oropon or peroly, using 12 oz. per 100 lbs. of pelt and running for an hour in a drum or a paddle at a temperature of 37°C. They are next drenched in bran in the usual way for about an hour and then well scudded on the beam.

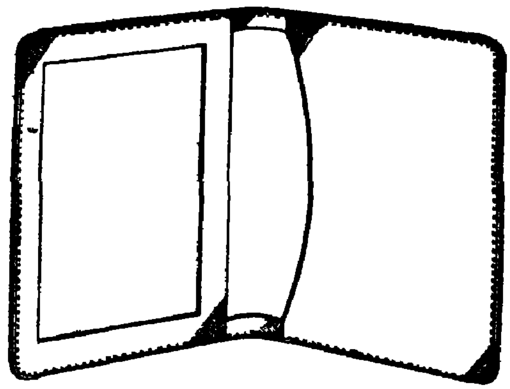


Fig. 17. Cut-edged Wallets.

They are then bark-tanned: babul, sonali or avaram bark may be used. either alone or blended in suitable proportions. The drenched skins are handled in an old mellow liquor for 2 or 3 days and then taken over to stronger and fresher liquors. Tanning may be completed in these liquors. After thorough tanning the skins are given a myrobalan bath in a clear myrab liquor for 2 days.

The skins are then taken out, slicked on the table. lightly oiled on the grain with sesame oil and hang up to dry. The dried skins from the crust stock from which skins are taken out for dyeing and finishing as required.

Instead of starting from raw goatskins the half-tanned goatskins of Madras or Bombay may be taken. For making morocco leather from them, they should first of all be stripped by drumming in a weak alkaline solution in order to remove

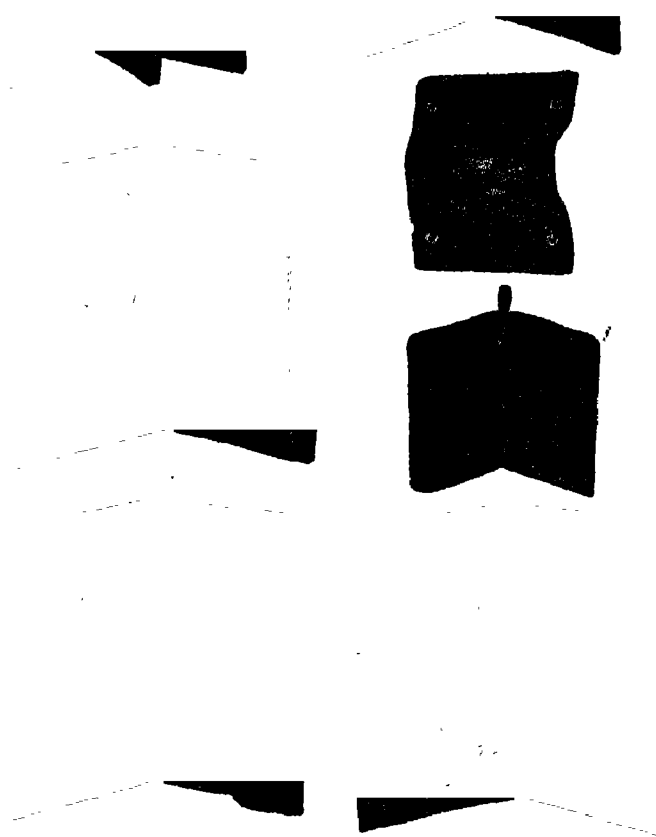


Fig. 18. Cut-edged Pocket Cases.

the oil invariably present in this type of skin, usually borax or soda is employed. If the skins are too greasy, soda ash should be taken 1½ to 2 oz. of soda crystals or half these quantities of soda ash are sufficient for a dozen skins. The stripping is done in a drum at about 30°C and is completed in about quarter of an hour.

If the skins are not too greasy the stripping may be done by borax, using 2 oz. per dozen skins.

The half-tanned skins are deficient in tannage to begin with and the stripping with alkali causes further loss of tannin. The skins have, therefore, to be retanned after stripping. In retaining about 2 lbs. of sumach leaves are used for dozen skins. The sumach is extracted with hot water and the extract together with the leaves is poured into the drum containing stripped and washed skins. The skins are run in the sumach liquor for one hour. They are then washed to remove the adhering leaves, struck out and got ready for dyeing.



Fig. 19. Vanity Bags.

The dyeing should be done with acid colours using formic acid in the dye bath to bring out the full depth of the shade. The operation may be carried out in the drum. If only a few skins are to be dyed the operation may be performed quite well in a wooden tub, agitating the skins in the bath by manual labour. The temperature of the dye bath should not exceed 50°C. The dye solution should be added to the bath in 2 portions at an interval of 15 interval of 15 minutes. Dyeing would be complete in 30 to 45 minutes. After dyeing the skins are well washed in several changes of cold water to remove any uncombined dye.

The dyed and washed skins are struck out on flesh and grain and then nailed on boards for drying. The dried skins are trimmed round the edges, then they are seasoned by brushing on the grain the following solution:—

Milk	10 oz.
White of 20 eggs.	
Water to make	1 gal.

Morocco leather prepared in this wav will usually stand dry rubbing, but will give off dve when rubbed with a wet handkerchief. To make the colour fast to wet-rubbing, a protective varnish or

lacquer should be sponged on the grain finally.

LEATHER GOODS.

Having finished the various methods of tanning hides and skins and the process of dyeing we shall pass on to the manufacture of some of the fancy leather goods such as suitcase, bags, purses, writing case, vanity bags, wallets, etc.

TOOLS REQUIRED.

The tools required by the leather worker are of a simple type, and consist of at least two knives of suitable pattern for cutting and pairing, together with the means of sharpening each; a 12 inch steel ruler of engineers pattern and a 12 inch flat wooden ruler: a steel square of L shape, the long side measuring 12 inch and the short side 6 inch inscribed with inches and fractional markings of eighths: one or two bone folders; one marking awl for piercing holes; creasing irons, scissors, chisels of assorted widths for cutting openings in leather parts for the insertion of straps, locks, etc., hollow punches to make circular holes: a leather worker's hammer and a small hammer for reveting: cutting pliers for shortening rivets; a p of steel compasses; a hard wood rolli pin for the flatting of adhered parts a certain special pliers and instruments hand bag framing. The accompanyi illustrations will show some of the i portant tools.

REINFORCEMENTS.

In the construction of leather goc it becomes necessary to introduce ad tional material between the outside e lining of an article in order to strength all over or only in parts the outer mater or to add substance or impart rigidity the leather. Such applied materials known as reinforcements. Although le ther itself is used as an interior reinfor ment, the term applies more specifica to those supplied in sheets as plywoc fibre board and other pulp board, pa and fabric, which are manufactured pecially for the purpose. Fabric is oft used in combination with the other ma rials for added strength. These re forcements are all of lower value th the leather to which they are applied, a although in many instances they are ind pensable they are undoubtedly used to

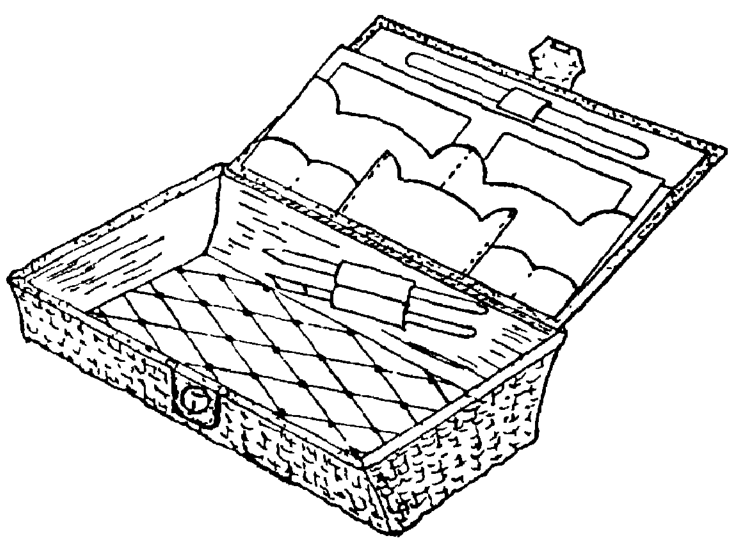


Fig. 20. Suitcase.

greater degree in leather goods to take place of actual leather substance.

LINING MATERIALS.

The lining materials employed for leather goods may be roughly separated into three groups, namely, those of leather those of plain and fancy cotton and those of more ornamental design and finish manufactured from real silk and rayon. Materials of each group are used for all classes of leather goods both large and small, thus adding to the infinite variety of articles which exist.

PREPARATORY PROCESS.

In the successful making of fancy leather goods there are certain processes involved which are common to the production of all types of articles whether large or small, and a measure of skill should be gained by the study and practice of each of those before the learner attempts the making of complete articles. These processes are cutting, paring or skirving, turning over, and creasing, a brief descriptions of each is given below:—

CUTTING.

Cutting is the preliminary process of manufacture as all leather, reinforcements, and linings must be cut to the required sizes and patterns. The bulk of this work is performed with the hand knife and press cutting tools, by means of which parts are stamped out by machine, being employed only for the mass production of the cheaper grades of leather goods.

The cutting or "clicking" of leather parts from the hide or skin is usually the province of expert employees having a considerable knowledge of leather and experience in its economical cutting.

The leather parts should be cut exactly to required sizes whilst the fabric parts are cut exactly to size or slightly full according to their nature and purpose. The cutting of fabrics oversize is advisable if they are inclined to fray at the edges and are intended for pocket linings, and also when they are to be adhered to reinforcements and the combination subsequently trimmed to exact size.

For ordinary cutting purposes a piece of stout strawboard or other soft pulpboard is satisfactory, or a piece of stout zinc may be used, and either may conveniently be placed on the paring stone, a level and firm foundation being essential.

Straight cutting is performed with the aid of the square. The material is first placed on the cutting board or zinc, and the square is then pressed firmly on to the material by the extended thumb and fingers of the left hand. The cutting knife is grasped in the right hand, the handle being covered by the palm and the second joint of the forefinger pressed on the back of the blade. The hand should be advanced as far as possible towards the point of the knife so that the greatest pressure can be applied to the cutting edge. The cut is made by resting the blade against the edge of the square, pressing downward until the cutting edge has pierced the material, and then drawing the knife steadily towards the body, so severing the material.

The cutting of curved edges is performed freehand, the knife being held at an angle of about 60 degrees between the thumb and fingers of the right hand, with the forefinger extended along the back of the blade and the remaining fingers pressed closely against the side of the blade. The knife should be held by the blade, not by the handle, and as closely to the point as possible so that the maximum power can be directed to the cutting edge.

PARING.

Paring or skiving is the process by which leather parts are reduced to suitable substances to enable them to be

turned over at the edges to enclose reinforcements. linings. and other interior parts; to thin entire areas for gussets, bindings. the linings of small parts, etc. to remove substances at certain parts to facilitate the folding up of articles and flaps, and to bevel the edges of leather parts which are to be lapped on to and joined to other parts.

The bulk of paring is performed by machines specially designed for the purpose, but in the making of fine leather goods a certain amount of hand paring is carried out by the worker after the parts have been machine-pared, edges being touched up and corners and other places being further reduced to simplify subsequent making-up processes and to ensure the best appearance and finish of the completed articles.

TURNING OVER.

The process of turning over is one of the principal operations carried out in the making of all turned-edged leather goods. the object of turning over the pared margins of leather parts being to impart neatness and finish to the edge and to enclose and bind the edges of the layers of material forming the lining and interiors firmly together. The finished edge so formed is smooth and rounded, and it is durable by reason of the grain surface. which is the strongest part of leather, forming the outer surface.

Straight turnovers for stiffened articles are simplest to execute as the reinforcement incorporated provides a firm edge over which the leather may be folded. Turnovers of limp goods are more difficult as the soft fabric lining presents little resistance to the turning over of the leather margin, particularly if the leather is of a harsh variety.

CREASING.

Creasing is an operation performed by the leather worker in the making of both cut-edged and turned-edged leather goods. It is a process of inscribing lines with a heated iron to increase the durability of articles and, at the same time, it embellishes them. Its primary purpose in making cut-edged goods is to compress the cut fibres at the edges of the parts and so prevent or minimize their tendecy to fray and separate with a resulting loss of strength. The crease iron also imparts a bordering line which improves the appearance of the article. In turned-edged goods the warm iron is used to impress a line near to the edge or such other position as may be required, the effect being to compress the leather and interior materials and so create a line of resistance. Creasing is also employed to embed the extremity of a fine-edge join, making the join inconspicuous and minimizing the possibility of the overlap opening up.

There is some variety in the patterns of creasing irons according to their particular purpose. Some are provided with guides (adjusted fixed) for creasing the edges of turned-edged or for cut-edged work; single-line creasers, without guides, are for general creasing on turned-edged articles: and there are also two-line and three-line irons for ornamentation, all of which are made in light or heavy styles.

For cut-edged fancy leather goods, the short-handled solid pattern in which the creasing surface is cut with a slight projection or ridge at one side to form a guide is the most useful type.

The working edge of all crease irons must be smoothly finished to avoid scratching during creasing, and the forepart and heel should be very slightly rounded off. The constant heating and cooling softens the iron, and to avoid accidental damage by contact with a steel tool a leather sheath or slip may be made to protect the blade when not in use.

CUT-EDGED ARTICLES.

Cut-edged light leather articles are a cheaper grade of fancy leather goods which have a considerable market owing to the comparatively low cost consequent on their simplicity of manufacture. Purses, paper money cases, wallets, certain types of cigarette cases, season ticket and card cases; wrist watch straps; sheaths for match boxes, mirrors, manicure instruments and similar articles carried in the hand bag or pocket are made in cut-edged style.

For the successful making of cut-edged goods, a firm, closetextured leather is essential. Goat leathers, certain grades of calf, pigskin, seal and reptile leathers fulfil the required qualification, while for cheap grades, hide bellies, kips and the middle splits of pigskin and seal are used.

The leather should preferably be vegetable tanned as this method of tannage enables a smooth, high polish to be applied to the edges, an important feature of cut-edged work, whereas chromed leather, by reason of the fibres being harsh and springy, is more difficult to finish at the edges.

BOOK MATCH CASES.

This is a simple example of cut-e work consisting of an outer leather ing the back and flaps to which is sec by stitching at the side edge, a le hand, under which is slipped the cover of the matches. The leather is fastened with a small press butto

A pattern cut from brown paper corresponding to the outer le is required in order that the position c band and fastenery parts may be m on the leather. An average size fo pattern is 5¾ in. long by 1⅞ in. wide two point holes at each side 1¼ in. a the lowest pair of holes being 2 in. the bottom. The four points mark position of the band, and two other holes in a central position ½ in. withi top and bottom edges denote the positions of the fastener parts. The way to cut the pattern is first to cut a of paper of sufficient length to the req width, namely 1⅞ in. Fold the strip its centre line so that the cut edges ex coincide, then make a point hole 1/1 within the double edge about ¼ in. the left-hand end of the paper. From starting-point mark 2 in., this giving

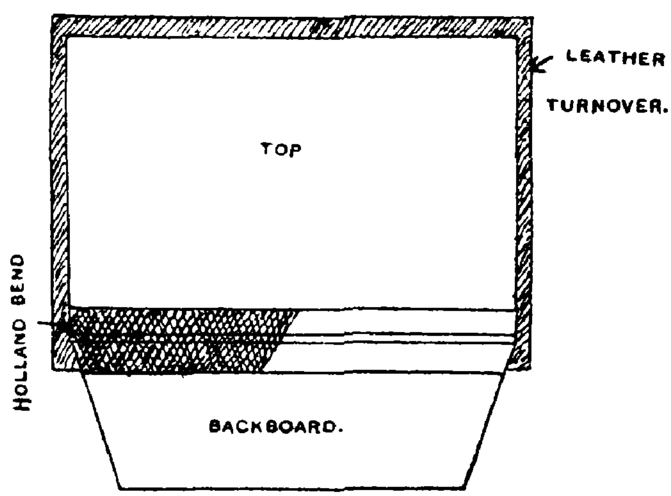


Fig. 21. Lid Hinges.

ɔosition of the lower edge of the band. :hen 1¼ in., the upper edge of the band. .hen 2¼ in., which denotes to top edge of he cover. All point holes must penetrate he double thickness of paper and must be ·lear but not unnecessarily large. The ›aper is then unfolded and cut across at he extreme left and right-hand point narks; set in the fastener markings ½ in. rom each end along the centre corners to ¡uadrants of ¼ in. redius, using the divid-rs for setting out the curves or trimming ɔ a small coin or corner pattern. The aper may now be opened out and the attern is ready for use. This method of utting and marking up paper patterns is ıuch employed in fancy leather goods ıaking. It is simple and efficient provided ıe necessary cutting is correctly perform-ɟ and the edges are exactly aligned ıroughout their entire length during the oint markings.

The leather pieces for the cover and and are now cut to size, this being per-›rmed with the square and steel rule and orking to measurements. Quantity ıtting for small articles of this type here no curves, except at the corners, are ıvolved is sometimes carried out by cutt-ıg strips of the required width from a ıece of leather previously cut to the ›rrect length, the bands being similarly ıt. Alternatively, stout zinc or metal ›und patterns are prepared and the parts :licked" out.

The corners of the cover leather are ›unded and the point marks transferred ›rm the paper pattern by laying the latter ı to the flesh side of the leather and ·ickling through the holes. Note that ›int marking must be carried out on the ıtting board and not on the paring stone ırface.

The top and bottom edges of the band ıve now to be stained, polished and eased.

When the polishing has been completed and the two long edges of the band are quite drv thev are creased with a solid edge crease iron. The band is now tacked in its position on the interior of the cover leather with a touch of strong paste at the ends. For this tacking, rye flour or one of the ready-made pastes of similar composition is used.

The ends of the band are machine-sewn to the sides of the cover and the finishing of the cover edges proceeded with by first applying the stain to the edges and then polishing to a smooth surface. When drv the cover edges are creased around from the inside of the case, and then creased from the outside, effecting a clean, unbroken, well-impressed and burinshed bordering line to the edge.

CUT-EDGED WALLETS.

Cut-edged card cases, letter cases, similar articles of the centre folding type have the addition of a ¼ in. strip of leather at each end of the bend for strength. These pieces should extend for ¼ in. on each side between the pocket fronts and the cover leather, the extensions being bevelled off before thev are pasted to the interior of the cover leather.

When division are introduced between the pocket fronts and cover to form additional pockets, the division leather must be bevelled on the flesh side to half substance on the three sides which are to be attached to the cover.

Bank note cases have a pocket extending over the full area of the case. The open end of the pocket is closed by a flap which is a continuation of the cover leather, and which is fastened by means of a stitched-on leather tab passing under a strip of leather cut into the adjacent pocket. The upper surface of the bank note pocket consists of a sigle piece of leather grain side upper-most, and is re-

ferred as the "bed." Thus a double layer of leather is formed at the bend and in consequence the ½ in. strengthening strips are unnecessary; in this type of case four substances of leather are brought together at certain parts of the article and so the bed must be bevelled to one third substance except at the bend edges and the edge forming the bank note pocket opening. Divisions, too, must be bevelled to the same substance on three sides to avoid thick or clumsy edges to the main parts of the case.

In making up, the finishing of interior edges such as the tops of pockets and partitions, the edges of apertures for season tickets, photographs, etc., together with small superimposed pockets for cards and postage stamps, and attachments such as tabs, straps, pencil loops and bars, must be carried out prior to assembly. The edges of these parts are usually creased on the grain side only, while the exterior edges of the completed article are creased on both sides, first from the inside and afterwards from the outside. The latter procedure must not be reversed, for the second line presses out the first to some extent and it is desirable that the outside should present the better appearance. Exterior edges are always finished after the articles is stitched.

For the stitching of cut-edged work a strong silk or linen thread is necessary as serviceability of this class of goods is more dependent on the strength of the stitching than in the case with turned-edged work.

Hand-sewing is employed for the best grade of articles, but unless these are constructed of a really firm leather, the resulting appearance may be disappointing.

Stitched edges should be lightly hammered with the large hammer before commencing to finish the edges as the hammer embeds the stitches so making them less subject to frictional wear.

The incorporation of fabric for the formation or lining of pockets and divisions should be avoided where possible in cut-edged work as the strands will unravel when the edges of the case are polished and spoil their appearance.

TURNED-EDGED GOODS.

The making of semi-limp and of limp turned-edged work differs only in the inclusion of a paper reinforcement in the former to compensate for a deficiency of leather substance or to make the article a more rigid. Articles of skiver leather generally require a reinforcement of blotting paper, while for similar articles of a more substantial leather the paper would be unnecessary but might be replaced by a fabric interlining.

The making of semi-limp turned-edged goods is simpler to the beginner, the reinforcement providing a foundation and ensuring a more uniform standard of work. The following examples are described in the semi-lamp style by omitting the paper from all parts except tabs, straps, and borders.

SIMPLE CARD CASE.

In making a card case it is necessary to first cut a suitable pattern. The best way to cut out a pattern for this kind of case, is to first cut a stiff paper pattern ten inches long and four inches wide, taking care that it is cut exactly the same width at each end of the strip, and then to fold it quite evenly into two by doubling it in halves long ways; afterwards marking the depth of the pockets and the bend in the centre. The next thing to do is to cut the scallops; to do this keep the paper folded and draw half the scallop with a pencil. Cut this first with the scissors, and then afterwards cut the other half to it, as by this means both halves may be made exactly true to each other. After these directions have been carried out and a complete paper pattern produced, this is

either laid on the piece of millboard and after round the outline of the pattern with a sharp black lead pencil the pattern is cut out, or the paper pattern may be stuck on with paste or glue and the millboard afterwards cut to it. All that now remains to be done is to lightly score with a knife and straight edge the parts where the pockets turn up. The "bend" of a case is the trade term for the part that either folds up, or folds over.

When the pattern is ready, the piece of leather is then cut about half an inch larger all the way round in order to give sufficient materials to form the turnover. The piece of leather is now laid finished or grain side downwards on the stone table, next place the pattern in the centre of the leather and mark all round close up against the edge with the "folder"; this gives the line to which to pare, that being the next process.

The operation of paring or skiving requires considerable skill; the leather requires to be pared down from just beyond the line of the turnover until it is sufficiently thin to allow it to be folded over evenly and neatly; pastegrain skiver when of good quality is one of the easiest kinds of leather to pare.

When carrying out the paring, the knife must be held by the right hand, forefinger pressing firmly near the edge and the thumb resting on the back of the knife, the remaining three fingers firmly gripping the handle; the shaving away of the leather should commence at a point just within the marked line, and the knife should be pushed forward, taking off a very thin slice at each forward movement.

The leather for the card case is then to be carefully pared all the way round just within the mark. After this a silk, satin, or twill lining according to requirements is cut the same width, but about ⅛th inch shorter than the pattern.

It is laid on the leather so as to touch the scallop line at one end, and the "turnover" or pared edge is given an application of paste with a small brush. A piece of thin zinc which has been previously cut to the proper shape laid on the top of the lining in order to form a firmedge for turning over on, and also to allow of cutting the edge of the "turnover" to a uniform line, with the cutting knife. The turnover having been pulled over on to the zinc is trimmed evenly, the zinc is removed and the pasted turnover is then flattened down so as to firmly adhere to the silk lining. The lining is stretched by putting it to the opposite scallop line in order to make it quite taut, and the "turnover" treated in the same manner as described above. The figure No. 7 shows the leather with the lining on, and one scallop turned over. It will be noted that the "turn-over" requires to be cut or nicked slightly, at right angles to the edge, in order to make it turn over regularly and evenly without any tendency to puckering. The dotted line shown in the sketch represents the lining before being stretched. The turnover must now be cut away and the pockets folded up so that they meet the bend lines at either side; these are now stuck down along the side edges and the care is then in the condition shewn in Fig. 8. A straight narrow piece of zinc is used for the side "turnovers" on which they are turned in the same manner as the scallops. Trim off the edges with a sharp knife and straight edge to a uniform ¼ inch width, remove the zinc pattern from under the edges and flatten the turnovers down. The case is now laid between two pieces of strawboard and a small weight is placed on the top so as to keep it flat until quite dry. When dry it can be machine stitched along the two sides, or hand stitched across the bend only, whichever is preferred, and it is then complete with the possible exception of varnishing.

STITCHED PURSE.

There are many kinds of purses in universal use. The more common purses are the bag purse, stitched purse, the one-piece purse, etc. all of which have variations in both general design and in the method of making up.

A hand purse in common use is that described in the trade as the "stitch-purse". No doubt the chief reason for the popularity of this purse with the public is, that it is one of the most durable made and possesses an elegance of its own, which compares favourably with more expensive makes.

When making a stitched purse of a usual size, say 4½ by 2½ inches, sixteen pieces of leather, which should be moderately thin in substance, are required for the pockets. These are cut to a uniform size of 5 by 3½ inches, and then eight of the pieces are pared along one side to a distance of about ⅜ inch in.; the pieces are next thoroughly pasted and laid on the remaining eight, laying each close up to the turnover. The turnovers are repasted and then turned on to the straight piece of zinc, afterwards cutting each down to a uniform width with the knife and straight edge. When the pieces are partially dry they are given a good rolling on the stone with the rolling pin and afterwards placed between boards to keep them flat. The next process is to fasten these pockets together in pairs, applying a little glue to the extreme edges of each, taking care that the tops of the pockets where they have been turned over, and laid together quite evenly. No glue, of course, is to be put along these top edges. The pockets are now stitched round by machine, as shewn where the dotted line is seen in the middle of the pocket. A "creator" and a "pattern" are necessary in order to ensure a perfectly regular stitched result. In the case under notice, the patterns of each component part are marked out as required. The first pattern is made by cutting out a piece of cardboard, size 4½ by 2½ inches: the bottom corners being cut round and the centre shape being cut out. The pattern is laid on each pair of the leather pockets and a line is creased round the inside of the cut out shape to act as a guide to the machinist. This centre shape can either be cut out square so that the stitching will appear.

A zinc pattern is now cut the same size and shape as the cardboard pattern. Each pair of leather pockets are accurately cut down to the exact size of this pattern, and the individual pockets are fastened together to form the whole of the inside of the purse, as illustrated in the diagram 9. Each pocket is first lightly touched with the glue brush round the outside edges and the whole are laid accurately together in a pile. These pared strips of leather are next carefully cut wherewith to tip or bind the pockets together round the outside edges. Having been bound together in this way they are now machined round the tipping, where the dotted line is seen in the figure.

The next operations to be performed are the making of the front and the flap. In order to enable the workman to proceed with these, patterns will be required to be made similar to those illustrated in the figures 10 and 11.

Having made the patterns and cut out suitable pieces of leather, the making up is proceeded with. The front of the purse will require to have a piece of felt paper affixed between the outside leather cover and the lining, which usually consists of a piece of skiver or sheep leather.

The lining for the front requires cutting to the exact size of the front pattern. After the outside leather, which must be cut with a turnover all round, has been pared, it is turned over on to the lining at

the top only. Before turning over, a narrow piece of holland about a ½ inch wide is inserted by laying-in at each corner, so that it lies right across the turnover and just on to the edge of the felt paper, in order to strengthen the corners. The front having been turned over at the top a straight partition is made to fit on before the flap is placed in position: the dotted line representing the top of straight partition. A piece of the same leather as used for the lining is firmly glued to a piece of sateen, which should be slightly larger than the front pattern; which pattern is used for trimming it, except that no scallop is cut. After this has been done, the partition is tipped to a distance of about half the depth with a piece of the same leather that has been used for the outside: it is then attached to the front by stitching.

The front flap is next made and the front is then ready to be attached. This front flap fits down behind the straight partition, the flap part laying over the front, just to the top edge of the lock; the instructions given for making the outside flap also apply in this case. The back and flap of the purse are next prepared. One of two alternatives may be selected; the purse may be made either with a tight pocket at the back, or the back and flap can be made in one piece, as is shewn in the diagram 12. If the latter method be selected a paper or thin board pattern is first cut the exact width of the front pattern: after squaring off the depth of the purse the bend and flap is marked off, when the pattern is complete. A pair of flap zincs cut to this patterns are also required.

If a tight pocket at the back is required, and this style is to be generally recommended both on account of usefulness and appearance, this can be done by working in the same manner as described for the manufacture of the front excepting for the difference in shape of the scallop, and there being no necessity for a straight partition, as is the case with the front. The shape of scallop is illustrated in Fig. 13.

To make the back and flap in one piece the morocco or other leather intended for the outside, is first cut out to size and a turnover skived all the way round. The sheep leather intended for the inside is now cut out the same size as the large "flap-tin" or zinc. The patterns, made of zinc as previously described, are generally called "tins" by the worker; this is really a misnomer, but is the workshop custom. The outside leather is now pared very thin all round, and afterwards marked to size by pattern, so that the flap, bend and back are shewn in Fig. 12.

The top portion of the lock is first taken and placed on the pattern, as shewn, taking care to see that it is placed exactly central. A prick mark is then made with the point through the lock hole, where the rivetting pin goes. Having in this way marked the pattern, this is then used for marking the flap. A hole is pricked right through the flap with the point, and "the link", or top portion of the lock is put on and the pin pushed through.

It is most essential that the pins should exactly fit the holes, because a loose pin cannot be properly rivetted.

The bolt portion of the lock is next taken and a hole out through the front pattern, placing it in position so that the tangs at the back of the lock just go through, but fit quite tightly; the exact position of this hole is determined by the flap. The flap with the lock on is first placed on to the front pattern, with the top edge of the front lying quite even with the flap where it meets the bend, and a square cut out where the link touches Fig. 14. The lock hole having been made in the pattern, the front is first strengthened by sticking a piece of holland on the back,

and is then marked by first scratching round the hole with the point, afterwards cutting out with a sharp knife through the outside leather and holland only, taking care not to cut through the lining. Having cut out the lock hole the front is now ready to be machined to the straight partition. In putting this part of the lock on, the lining is turned up at the bottom in order that the lock tangs can be turned back and made secure.

The various parts of the purse are now ready to be put together. The back is first fixed. Having trimmed the turnover, the back edges of the inside pockets are lightly glued and placed carefully in position on the back. Sufficient time having been allowed to elapse to ensure the glue sticking the two portions firmly together, the back turnover is now pasted and turned on to the end flap of the pockets. The front is taken and the edge of the front flap of the pockets glued and placed in position on to the back of it, the turnover is trimmed and fastened down to the inside pockets in the same manner as described for the back, by pasting the turnover and turning it on in a similar way. The purse is now finished with the exception of creasing and varnishing.

MOULDED LEATHER GOODS.

Moulded work is the descriptive name applied to a class of fancy leather goods in the construction of which a foundation is produced by gluing successive layers of strong paper to a lining arranged about a wood block. The wood block is of the shape and size of the intended contended contents of the required sheath or case, and the paper layers are moulded to the shape of the block by pressure applied before the adhesive has set. In this way flatsided, cylindrical, or other shaped foundations are constructed which, when covered, form articles of an extremely durable and protective nature.

SHEATHS.

Moulded sheaths are distinguished by being open at one or both ends as for match boxes, combs, mirrors, bank books, motor licences, cigarette packets, etc. Moulded cases are those which may be entirely closed by means of a detachable section of a second or exterior moulding and are usually known as "telescopic" or "pull-off" moulded cases. These are made for holding various kinds of bottles, vacuum flasks, playing cards, cigars and cigarettes, and other articles where the need of a close-fitting, protective covering arises. Other moulded articles are closed by means of a limp flap either joined to, or in one piece with, the covering leather. Moulded sections are sometimes incorporated into other leather goods, the moulded portion forming a receptacle or pocket for an article which requires special protection, such as for watches fitted to the interiors of travelling bags or dressing cases.

A simple example of moulded work is the match box sheath and for its construction a wood block of the exact width and thickness of the box is required as a foundation for the mouldings. This article being a sheath with open ends, the block is, for convenience of working, of greater length than the required sheath. When qauntities of small sheaths are to be made, it is customary to use a block sufficiently long to mould three or four articles in one piece, separating each by cutting when the moulding has hardened.

The block is first covered with a wrapping of sugar or blotting paper, the overlap being joined by a glued margin ¼ in. in width and the surplus paper torn off. The glued edge is arranged flush with one edge of the block, the sugar paper wrapped tightly round the block and the finishing end pressed on to the adhesive.

The surplus paper should be torn off in such manner as to bevel the overlap and so avoid the ridge caused by cutting the finishing end. This preliminary wrapping is known as the allowance paper, and does not form part of the sheath. Its purpose is to space the moulding from the block to allow for the thickness of the turnovers of the covering leather at the ends of the sheath, thus ensuring that the internal dimensions of the covered moulding are correct. A lining material of fancy paper or thin leather is next wrapped around and the overlap joined. The width of the lining should be ¼ in. in excess of the finished length of the moulding to allow for subsequent trimming to size, its commencing edge should be placed on the opposite side of the block to the allowance joining in accordance with a principle of moulded work, namely, to avoid lumpiness or undue thickness due to joins being arranged one over the other. If the lining is of paper, it should be joined with glue and the surplus torn off, but a leather lining should first be cut to correct length, pared for joining, and paste used for adhering the overlap. Care must be taken that no part of the lining is adhered to the allowance paper.

For the actual moulding a piece of brown kraft, old ledger, or cartridge paper is required. This should be cut 2 in. longer than in necessary to wrap around the block three times. The width of the moulding paper should correspond to that of the lining material. One end of the moulding paper is cut square, and the whole piece is glued with hot, evenly running glue. The glued paper is taken and the squared end laid on to the partly covered block, the commencing edge being arranged flush with the edge of the work. The work is then reversed, bringing the glued surface of the paper uppermost and extended in front of the worker. While pressing down the farther end of the paper with the fingers of the left hand, the partly covered block is turned over and over on to the remainder of the glued moulding paper until three layers have been taken up. When the position of the commencing edge has been reached, the paper is severed with the cutting knife. During the winding process the work must be strained forward at each turn so that the paper is adhered tightly and flat to each surface. Finally, the folder is applied to each to compress the adhered layers. The pressure forces the glue into the paper and make the moulding very hard when dry. By pressing each surface of the moulding on the stone and applying the rounded end of the folder against the edge resting on the stone, the edges are "sharpened." The surfaces and edges of a well-finished moulding of this kind should be respectively as flat and as sharp as those of the block. When quite dry, the moulding is trimmed to correct length, the moulding being cut through while it is still on the block with the aid of a small steel square.

To cover the sheath, first remove the block and discard the allowance paper. Cut a leather covering, having a joining allowance of ¼ in. and turnovers of ¼ in. to turn into the ends of the moulding. Pare the joining edges, fine-edging the finishing edge (ie. the overlapping edge), and feather-edge the other. Pare the covering leather and attach the finishing edge to the moulding, arranging this edge almost flush with one of the edges of the moulding. The leather edge must not be pressed down at this stage. Wrap the covering tightly around the moulding, then, lifting up the finishing edge fix down the opposite end of the covering leather and reset the finishing edge over it. Work the turnovers over the ends of the moulding, adhering them closely to the interior surfaces and removing the pleats from the inner corners with the point of the folder.

When the covering is nearly dry, replace the block to prevent warping or distortion due to shrinkage. The cutting of the opening to expose the striking surface of the match box together with the creasing should be carried out when the leather is quite dry. The cut edges of the opening are finished by staining and polishing.

MOULDED CASES.

The type of "pull-off" moulded case entails the making of two separate moulded sections. One forms the inner sheath and the second moulding is made over this and is subsequently divided into two parts. After the three parts so formed are covered, one portion of the outer moulding is permanently fixed to the lower part of the sheath section, the second portion of the outer moulding serving as the lid or cap to close the case.

To construct a moulded case of this kind, the moulding block must be of the same length as well as of the same width and thickness as the required interior dimensions. The inner moulding is made exactly as for the match box sheath described, but must be kept to the length of the block. It is the practice to cut the allowance paper ⅛ in. shorter than the block length but to allow a slight excess of width when cutting the lining and moulding paper. The excess length of the inner moulding may be trimmed off with the scissors when this portion has been made.

Before proceeding with the outer moulding an allowance wrapping must be placed round. In this case the allowance must be sufficient for the substance of the leather with which the exposed portion of the inner moulding is to be covered as well as the turnovers of the outer coverings. In consequence, it must be at least twice the substance of the allowance for the inner moulding, according to whether the leather to be used for covering is stout or thin. For this second allowance, a stri of suitable paper is cut ⅛ in. narrower tha the block length and long enough t encircle the inner moulding two or thre times (twice for a thin leather or thre times for a stouter leather). The allowanc paper is wrapped tightly around an secured by gluing down the finishing edg

The lining of the outer moulding con sists of a piece of material sufficient t encircle the covered block once, togethe with two pieces for the end linings havin a turnover allowance of ½ in., these turn overs being pared if of leather. Wra the lining around and join at the overlap Then apply adhesive for a width of ½ ir to the extremities of the lining materi and attach the end linings, nothing tha the face side of the material is adjacent t the block.

The moulding paper for the oute moulding must be cut to the exact lengt of the work and the commencing edg quite square. After gluing, the paper i wrapped around, care being taken that th side edges of each layer are in alignmen with block ends. To achieve this, it i extremely important that the commencin edge be truly square to the sides of th strip and that it be applied flush with th edge of the partly-made case. Unles these precautions are taken, the strip wil wind helically and the moulding will b spoiled. The moulding block must als be true since if it is out of square o tapered, the same trouble will arise.

When the outer moulding has bee completed, the ends are "capped" b applying glue freely to the exposed leathe end linings and attaching roughly-cu pieces of stout strawboard. The work i then set aside to dry, small weight bein placed on one end to ensure that the cap are well adhered.

After drying, the caps trimmed, an preferably one should be domed wit

sand-paper and made eventually the top of the case. This is a precaution against the case being stood upside-down or being opened from the wrong end.

The outer moulding is then cut through at the centre line and the two parts removed, the allowance paper is discarded, and the inner moulding shortened by ½ in or ¾ in. The shortening of the latter is necessary in a moulded case of this type so that the contents are readily accessible and do not have to be shaken out.

Covering is now proceeded with, the inner portion being covered for only one-half its length. The outer sections should have their ends covered first, fine-edging the large leather pieces over the turnovers of the end coverings.

After the case is creased, a little glue is applied to the interior surfaces of the lower portion of the outer moulding, and the uncovered part of the inner moulding fixed to it in this way.

The parts of moulded pull-off cases of the type described should be re-assembled in the same order as they have been moulded, and the coverings should be applied so that the joins of all parts coincide.

Actually the fine-edged leather joins on a wellfinished square-edged case should be invisible after creasing, but such perfection is not always obtained. In any event it is better for the fine edges of the three coverings to be in line on one side of the case than to be at different edges.

The making of cylindrical cases is similarly carried out, but the finishig edges of the moulding papers should be bevelled with fine sand-paper after the folder work. The overlaps of lining materials and allowances should not coincide or a ridge will be formeed which will be visible in the finished article.

The selection of moulding paper and the number of layers forming the moulding depend on the size of the article and whether it is to be of a light, medium, or stout nature. For a large moulding a stout grade of paper is advisable, three to four layers being applied. If a paper of normal substance were used, the number of layers would have to be increased to obtain the requisite thickness of the moulding and consequently the strip would be of such length as to make it difficult to work. Thin moulding papers are likely to wave and cockle on flat-sided articles, but are necessary for small shaped moulded work.

FANCY LEATHER BOXES.

The construction of certain articles of fancy leather goods consists of the covering and lining of wood boxes of many types and designs intended to contain jewellery, manicure instruments, toilet requisites or other useful articles.

There are three methods in general use for making boxes: (1) the wooden box; (2) the moulded box and (3) the built box.

The foundation of these boxes should be made by specialists from whom these should be purchased. The leather workers only do the job of covering and lining them artistically. As the construction of boxes is not the job of leather workers we refrain from dealing it but only treat with the process of covering and lining the boxes wih leather and silk.

To begin with the covering process let us take a concrete example, say a jewel box. This small box is to be provided with a leather hinge but large box having heavy lid is seldom hinged with leather.

The leather to be used for covering the outside of the top, back, and front of the box, must be cut from the skin in a whole piece, in order to ensure exact maching. The two ends, viz. the end for the lid, and the end for the well or body of the

box must also be cut in one piece for the same reason. When these two pieces of leather are again cut, for the purpose of covering the separate parts, care must be taken when putting them on the box to let them "run together properly"; that is, the two edges where the separating cut has been made must come together, and the pieces must not be reversed.

Covering is commenced by gluing the front covering, and laying on the front of the box to the markings. Reverse the work to bring the leather uppermost and press down evenly, working the leather closely around the projecting press piece. Work the leather turnovers on to the bottom and ends of the wood work with the thumb, the folder not being used for this turning operation. Similarly work the top turnover partly on to the lipping, then with the scissors nip at the sides of the catch nib to enable the turnover to be set around it. Press the leather firmly on to the lipping, and nip at the ends close against the interior sides of the box to permit the turnover to be worked on to the inside of the front. The leather will have formed into ears at the bottom and top corners of the front, and these surplus must be shipped off close to the wood foundation and the cut portions smoothed with the thumb. Then remove the surplus turnover width from the bottom and ends with the paring knife in the manner explained for built-up work. The wood must not be be weakened by deep cutting, and if the operation is performed without delay no difficulty will be found in removing the trimming. The surplus turnover from the front covering which adheres to the sides lippings is removed by diagonal cuts with paring knife at the front corners of the lipping.

Before leaving the front covering, the leather over the press piece should be again tightened around. A piece of scrap flannelette gripped in the finger-tips and worked around the projection is a means of achieving this objective.

The lid covering is next pr with by gluing the large leather a the hinge marking. To ensure adhesion at the hings position, t of the lid should also be glued.

Lay the top of the lid into the m and work the leather on to the fr back of the lid, tightening closely top edges. Then work the turnov the edges on to the ends of the will be found necessary to nip t overs at the hinge position to acc this). Work the lipping turnov nip where necessary, and press lid interior, the extreme edge of t over being adhered to the inside lid top. The end of the steel rule the interior of the lid and body box.

After trimming away the sur and turnover widths from the the next operation is the attachme remainder of the large leather to of the body of the box. A strip strawboard slightly longer than and about 1 in. in widths is req provide the hinge allowance.

Next open the lid right back a removing the allowance, press th body of the box closely at the hin with the object of securing adhesion at these parts. A goo to grip the wood surfaces at th of the hinge with a steel paper the glue is quite dry.

LINING.

The first operation is to see that tition along the back fits sufficien in order that when the leather put on, it will fit in satisfactori tight, a small piece can be shave edges with the paring knife. T is cut slightly than the partition, that besides turning over the te

be stuck to the bottom of the box: this serves the double purpose of making the partition more secure, and at the same time preventing the white wood showing between the partition and the bottom pads. The partition is glued down the edge where it fits into the groove, in order to properly secure it.

A leather lining can either be fine-edged round the inside well of the box, or a silk fillet, as it is called, can be put in. When the latter method is to be adopted a piece of thin middles ⅛th inch deeper than the well of the box is taken and covered with silk, turning about ¼ inch over at the top and leaving ⅛th inch at the bottom, beyond the board.

The inside of the well is glued, applying the glue either with the fore-finger or with a flat piece of wood, and the fillet is then stuck in; the ⅛th inch of silk below the board is stuck on to the inside bottom chosen, the covering should be done before the partition is put in, as the silk fillet should fit all round the box and project to a distance of ⅛th inch above the lipping. This having been done, and the back partition fixed, the cross partition is next fitted, after which three pads are required to be made: two for the bottom, one to be at each side of the cross partition, and the other to form the head and lining.

The bottom pads should be made of velvet, the head pad may be made of either velvet or silk, according to requirements. A silk head brightens up the appearance of a box very considerably.

The cleanest method of attaching the velvet is to cut a piece of paper the exact size of the pad, the velvet is laid flat on to a paste paper, and the cut paper placed on centrally, holding it with the fingers of the left hand whilst *pasting the turnover only.*

The velvet is turned over on to the back of the pad board, and the corners cut off afterwards by holding the scissors flat on the board, and cutting whilst they are in that position; first pinching the superfluous velvet together with the finger and thumb, in readiness for the cutting.

LADIES' HAND BAGS AND PURSES.

Ladies' handbags are a class of leather goods involving the use of a metal frame either for enclosing the entire contents of the article or to enclose an interior arrangement of pockets. Framed purses are also included in many designs of handbags.

Handbag and purse frames are obtainable from 8 cm. to 30 cm. in length, the smaller sizes being suitable for purses while the larger sizes are fitted to the more capacious types of handbags.

Frames are made principally of iron or brass. Iron frames are the cheapest and are quite serviceable but are not lasting as frames made of brass. The usual fastening devices for purses and bag frames are the twist knob arrangement and the spring catch. The frames are often fitted with an interior frame attached by means of a hinge pins and spaced by short lengths of metal tubing. Inner frames usually consist of two frame sections fastening by means of twist knobs in large designs for more commodious handbags, three and four sections are sometimes fitted so that additional pockets may be accommodated.

Handle attachments in the form of wire loops, rings, or beads are often fitted to handbag frames for the attachment of leather handles. These fittings may be at the top or ends of the back section or riveted to the outsides of the front and back sections. For large handbags the latter position provide the most satisfactory means of carrying; handles are thus attached to both the front and to back

of the frame and so prevent the accidental opening of the bag when being carried.

Hand bag frames are available in a number of patterns but in the selection and adoption of a particular frame its practicability in relation to the proposed model should be considered. Narrow opening frames should not be fitted to deep handbags; sufficient hand room to give the user access to the interior must be provided. The inner frame is an obstruction, and, therefore when this is fitted, a greater opening width of frame is necessary, than when no inner frame is attached for a bag of equal depth. Wide opening frames should not be fitted to shallow hand bags for the tendency is for some of the contents to spill over the sides, often a cause of hinge breakage.

SIMPLE BAG PURSE.

The framed purse is frequently fitted to the interiors of hand bags. For pattern cutting purposes a frame of the size required and of "raw" finish must be available. A piece of cartridge or brown kraft paper is cut to the required depth of the purse, plus a seaming allowance of $\frac{1}{8}$ in. If no particular depth is specified, a good plan is to make the depth equal to the open width of the frame, adding the seaming allowance mentioned.

Measure the frame length from the centre of one side section to the centre of the opposite side.

The length obtained is set out at the upper edge of the pattern strip and then the paper is folded and the markings transferred to the lower edge with the marking awl. From the point mark at the right-hand top of the paper, cut the paper at an angle of 45 degrees to the top edge. Lay one side of the frame to this slanted edge, arranging that the corner of the frame is flush with the top edge of the paper, then insert a point mark $\frac{1}{8}$ in. beyond the position of the hinge. The addition of $\frac{1}{8}$ in. to the leg measureme of the frame is for seaming allowanc Cut from the last point mark to the righ hand bottom marking. Fold the paper that the corners of the slanted edges me the point marks at the opposite side. ai cut that side of the pattern to correspon a the same time rounding off the botto corners.

The pattern so formed is for the pur outsides. For the lining pattern it duplicated and then reduced by $\frac{1}{8}$ in. at t seaming edges. The upper part of t pattern must not be reduced in size.

To make the purse, two outsi leathers and two linings (fabric or th leather) are cut to each pattern.

FRAME COVERING.

For covering the frame, two strips leather are required sufficiently wide wrap over the frame section and tu within the open edges of the frame co siderable amount of leather is turn within the frame section or little spa is left for the enclosing of the pur edges. The length of the strips should from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. shorter than the fran edges to allow for the necessary stretc ing around the frame to eliminate t pleats from the frame faces at the corne The frame coverings are pared thinly over and the long edges finished feather edging. The outside leathers a bevelled at the framing edges if they a of medium or stout substance leather, ai are also bevelled at the seaming edges of stout substance. In the interests appearance and durability it is not desi able for the seaming edges to be thi The leathers are next placed with th grain sides together and machine-stitch at the seaming edges. The bag or pock so formed is then inside out and the sea pressed out from the inside. The linin are similarly placed face to face ai machine-stitched at the seaming edg

The lining is then placed within the leather outside and the framing edges of both adhered with a narrow margin of adhesive. Thin glue or latex is best for the purpose. The framing edges may be machine-stitched if desired, and the centres (where the seams adjoin) may be buttonhole-stitched to make these parts neater. Machining and buttonhole-stitching are not strictly necessary but are performed on best-class work of thin kind.

The frame may be prepared for covering by varnishing with shellac varnish as this preparation gives better adhesion but it is often omitted from cheap productions.

FRAMING.

Framing methods differ to some degree according to the design of the purpose or hand bag and according to the type and finish of the frame to be attached. For the example under description and for hand bags of similar construction, the process of doubling the edges into the frame sections by means of a thin bladed steel tool known as a "pusher" is a satisfactory method.

To perform the framing operation in this manner, a small quantity of fish glue or similar "cold" adhesive is applied to the inner surfaces of the frame sections, using for preference a scrap of zinc about ¾ in. in width for the purpose. The adhesive should be evenly applied, care being taken to avoid an excess, which will probably squeeze out at a later stage and spoil the purse tops. A piece of scrap leather is laid on the paring stone to prevent damage to the frame coverings by friction and the opened frame laid on near to the front of the stone. The purse is taken and one of the straight top edges brought up within the frame and arranged so that its edge slightly overlaps the frame section farthest from the worker. The purse edge must also be adjusted so that its length is in agreement with the length of the frame; in other words. the centre of the purse top must be exactly at the centre of the frame. Any deviation from this will result in he finished purse being twisted.

The work is then pressed on to the stone and the purse edge and frame held with the finger-tips of the left hand. Commencing at a point ½ in. within the right-hand corner of the frame, a portion of the purse edge is doubled over the edge of the pusher and pushed within the frame at each stroke. and an effort should be made to stretch the purse top toward the left side with the pusher. for the tendency is for the purse top to work out of position during the operation.

The work is now turned and the opposite top edge brought within the frame. It is then overlapped and positioned on the frame section and doubled into the interior in the same way as the first edge.

The side edges are next adjusted and doubled in. For this operation the purse cannot be laid flat but must be held in the left hand or stood upright so that the side edges of the frame rest on the stone.

The corners are attended to last. and if there is a surplus of leather at these points. it should be cut off with the large scissors before these parts are pushed into the frame. It may be noted that it is the practice to leave the exact trimming to size of corner parts to the framer. as this permits of a certain amount of adjustment if necessary and avoids the possibility of a shortage of material at these important points.

Finally the frame is closed over the purse edges by pressure. For this purpose the frame may be placed on a covered steel surface and lightly hammered with the large hammer. first adhering a scrap of leather to the face of the hammer to prevent bruising the coverings. Alternatively

the pressure may be applied with a pair "closing" pliers, a tool having a double lever action or "toggle joint" which greatly increases the force exerted by the hand.

Purses and hand bags of this type are frequently "piped" at the seaming edges. The piping consists of a strip of leather approximately ⅜ in. in width folded throughout its length with the grain surface outside. The folded strip is machine-sewn to the grain side of one of the purse leathers with the cut edges of the piping kept level with the outer edges of the purse leather. The piping is arranged to commence and finish not less than ¼ in. below the corners of the seaming edges to prevent bulk and clumsiness at the hinge parts, the surplus piping being cut off. The second purse leather is then stitched through the piping to join to the first. Piping provides a finish to a seamed edge and adds to the durability of the article by taking much of the wear to which corners and edges are subjected.

Another variation from the purse described is in relation to the lining. For the example a separate lining pattern was made and the lining materials seamed and subsequently placed within the outside. This method produces what is known as a "loose" lining which can be pulled up from the interior of the purse. An alternative method is to cut the lining materials to the same size as the outside pattern, then to face the leather and linings as before and stitch the four substances with a single line of machining at the seaming edges. The leathers are then turned inside out. The lining is in this way secured to the bottom of the purse and is known as a "fixed" lining. This method is quicker and simpler, and is advantageous in arger articles when pockets are sewn to he lining sides by preventing the pulling p of the lining when articles are ex-acted from the pockets. Its disadvange is that the substance of the four seams must come to one side of the article and may spoil the appearance of that side.

LEATHER SUITCASE.

Leather suitcases and attache cases have come large into fasion during the last decade. Many kinds of suitcases are now manufactured in which leather is used either for utility or decoration. Besides leather other materials are also largely used in this industry, e.g., Silk, sateen, velvet, and other textile fabrics; brass, nickel plated articles, papers, cardboands, etc. In suitcase work sateen enters very largely; all fancy work baskets are lined inside with sateen, silk, velvet, etc.

There are several types of suitacases and it would take a very large volume indeed to explain their construction. In the present instance we have selected a particular variety to embrace a salient features and combine the principles incidental to the construction of these articles.

These suitcases are usually fitted with wooden beading round the top edge, about ⅜ inch in width, the beading being made in the form of a frame, which is pinned to the basket, the bottom of the beading being fitted so that it overhangs the inside and the outside of the basket equally. The work of lining and fitting is somewhat difficult for any one who has not had previous experience.

When preparing for the covering of the suitcases, it is customary first to line the front and two ends, with strawboard. Strips of the same thickness board, about ¾ inch, wide being glued to the back of these, and should project above the top edge a distance of ⅛ inch; very strong glue should be used for the fastening. The edge of the back strip must be fixed underneath the bearing. So that the top edge of the board projects inwards, and form a ledge for the lit to eventually rest upon. It will not be found an easy matter to fix these boards in, so that a nice even

ledge is made round the front and two sides. The front board should be put in first and wedged into position with a piece of spare board, of sufficient length to fit tightly between it and the back: this will ensure its holding in position until it has become stuck. The two end pieces are afterwards put in, and wedged in the same way, from left to right. A second piece of strawboard, of the same size as the front piece, will be required but this will not need a strip on it; the purpose for which this is required will be described later on.

The rim of the suitcase is tipped with leather all round the edge; the strips of leather being cut wide enough to allow of their going down into the case to a depth of about 1 inch, and underneath the outside edge of the beading. It will be found that the fixing of the leather properly over the edge is a difficult task, as it must be pushed right underneath, and beyond the edge of the work, in order that the white wood is well covered. When fixing the strips of leather, it will be found best to put the front and back pieces on first; these should be sufficiently long to allow of their lapping over the mitres. The end strips can then be "fine-edged" on, true to the mitre: the fine-edge being buried with a warm creaser.

The lid is next fitted; this should be cut from 3 lb. strawboard, and should be made to fit close in at the ends and front, but leaving a space of a full ⅛ th. inch between it and the back beading, to allow for the hinge. Having cut and fitted the board for the lid, the front edge of this should be marked, to prevent any liability of subsequently hinging on the wrong side, when the lid would then be found not to fit, because, as previously mentioned, the baskets are never quite square.

The inside card board is cut of a piece of thin leather or tip board, the exact size of the lid; a line is then marked round it with the dividers a ¼ inch in, and the margin afterwards cut off knife and straight edge. This method must always be adopted to ensure an exact fit when a board is not quite square. It will be readily seen that it is not possible to go wrong if the pad board is first cut to the exact size of lid, and margin then marked off with compasses.

The lid is next chamfered off all round the top edge, to a width of ½ inch. The leather cover is cut with a good wide turnover, particularly at the back, and stuck on to a stout middles board, the exact size of the lid. This is another exception to the rule of working leather loose; the reason in this particular case being that, if, "worked loose", the leather would be inclined to become baggy and unsightly, by the constant opening and snuffing of the hinge.

The strawboard, cut to the size of the front mentioned above, is stuck on to the back turnover at a position of about 3/16 inch from the back edge of the "middles". This hinges the lid to the inside back-board, which is further strengthened by a holland hinge lining; this must be well rubbed down in the space between the middles and the back-board. Before finally hinging on the lid, a half thickness of wadding is cut to the required size, ready to be slipped under the board after the turnover has been glued. The turnover is pulled as tightly as possible round the boards; and a leather hinge lining then placed on the top of the holland.

The lid, now ready for fixing, is first thoroughly glued on the back-board which, with the lid attachment, is placed in position in the basket; three or four long thin pins are driven through the uprights of the wicker from the outside, and the points clinched on the inside. The pins should be driven through near the top edge of the back-board, at a depth of certainly not more than ½ inch down, and

the clinching effected by placing an iron under the pin heads, and knocking the points down flat inside with a hammer, after turning the basket its side.

The lock and lock strap are next prepared. The lock strap is made of double holland, covered with a lining fine-edged on. The body portion of the lock is first rivetted to a covered piece of solid leather and this is then hand-stitched to the front of the basket, the stitches passing right through the strawboard lining in the interior. The lock strap with the link part of the lock, is stitched to the lid in the same manner. Care must be taken to place both quite central, and in the correct position.

The next operation is the making of the all round gusset pocket on the lid of the basket. The making of these pockets is not as difficult as would appear to be the case. A pattern is first made. Two pieces of leather 1¼ inches longer than the pattern, are now cut. The gusset leathers are cut "in pairs", this term meaning that the slope of one piece of leather cut the reverse way to the other; the gussets having to be fixed on opposite side of the case. A 1 inch turn over is pared at the top of each gusset and they are then thinned down for a distance of about 1 inch at the bottom. The necessity for thinning at the bottom is in order that the gusset shall lay flat and not tend to make the finished articles at all bulky. Two pieces of sateen, the same shape and size as the step gusset pattern, are next cut. The leather is pasted thoroughly, and by the aid of a straight piece of zinc the turnovers are turned on to the sateen. In this way the lid is fitted with gussets for holding letter paper, envelopes, etc.

Now comes to the inside lining. For this purpose four pieces of stout "middles"

LINING.

are cut of the requisite size, to allow their fitting the ends and sides of tl basket; these are properly shaped, in ord that they may fit to a nicety, from ju under the ledge, to the bottom. A furth set of four pieces, of the same size, a then cut from the thin middles; these a intended to be stuck on to the leather li ing, which must be cut with a turnover a round. The long pieces of the thick mi dles are covered with a half thickness wadding, previously cut accurately size; fastening the wadding by a dab glue, applied here and there.

The top turnover of the leather glued, and the pad placed on to it, ar then turned over: a strip of paper is glu along the bottom, half being attached the board, and the other half to the bc tom turnover, the leather being pull down tightly whilst this is being done, order that there may be no tendency f it to become loose afterwards. This tur over is glued on the inside bottom of tl casket when the pad is stuck in; the er overs being left up, in order to lap on the ends.

The short or end pieces are made in the same way, with the exception th the end turnovers, as well as the top, a turned down, leaving the bottom turnov up. After these have been stuck in, tl board for the bottom pad is fitted; in tl case not more than a 1/16 inch need given for the allowance.

The bottom board is padded with double thickness of wadding, and th covered with the leather, without ar paper backing.

The leather cover is creased diamo shape, using a doubleline creaser; sma holes are punched out at the points whe

the lines intersect each other, using a No. 2 round punch.

Buttons are made by covering the tops of small paper fasteners with very thinly pared leather; the tangs of the paper fasteners pushed through the small holes, and then turned tightly over on the side, this makes a smart looking pad.

When the basket is to be lined with sateen, the sateen is pleated across the boards, by gluing the extreme edges of two opposite sides of the board, and then, taking a length of sateen, the first pleat is folded and placed on the end of the board nearest the top edge, sticking it down at each side to the glued portion; the succeeding pleats are made, in the same way. The pleated boards are afterwards stuck into the basket, the sateen lapping on to the bottom.

The pad board is made in the same way as described above, when working with leather, with the exception that in place of leather covered paper fasteners, sateen covered buttons are sewn on. Round the top edge of the pleated boards which comes just below the ledge of the lid, a narrow fancy braid of a harmonising colour is finally, securely stuck.

These baskets, when well made, look very elegant and there is a very large trade done in them.

Before concluding this elaborate article we regret to mention here that for want of space we are unable to include the manufacture of shoe which is kept reserved for a subsequent issue.

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Pharmaceutical Recipes

TINCTURE CHIRATA COMPOUND.

Chirata, Cut small and bruised	100 grms.
Dried Sweet-orange peel, bruised	37.5 „
Cardamom, bruised	12.5 „
Alcohol (45 per cent.)	1000 c.c.

Macerate the ingredients in 250 c.c. of alcohol for 1 days; then filter and add the remaining alcohol to make up the required volume.

Dose:—30 to 60 minims.

SPIRIT OF PUDINA.

Pudina Oil	40 c.c.
Alcohol (90 per cent.) sufficient to produce	1000 c.c.

Dissolve. If the solution is not clear, shake with powdered talc and filter.

Dose:—8 to 16 minims.

SULPHUR-RESORCINOL OINTMENT (B.P.)

Sublimed sulphur, finely sifted	4.5 grms.
Resorcinol, finely sifted	3.0 „
Yellow soft paraffin	22.5 „

Mix.

AROMATIC TINCTURE OF CARDAMOM.

Cardamom, bruised	68.5 grms.
Tincture of ginger	62.5 c.c.
Oil of Caraway	10.4 „
Oil of Cinnamon	10.4 „
Oil of Clove	10.4 „
Alcohol (90 per cent.) to make	1000 c.c.

Macerate the cardamom in 750 c.c. of the ıol for 7 days, strain, and press the marc. ›lve the oils in the mixed tinctures, and add ient alcohol to produce the required volume.

ᒣEPARATION OF BENZOATED LARD.

ard	1000 grms.
enzoin, the coarse powder	30 „

elt the lard over water bath and add the n. Continue the heat at 60°C for 1 hour ng frequently, strain and agitate till cold.

CAMPHOR WATER.

mphor	1 gram.
ohol (90 p.c.)	2 c.c.
tilled water	1000 c.c.

ɜolve the camphor in the alcohol, add ›ortions to the water, agitating after dition; finally shake at intervals until ısolved.

DYSPEPSIA TABLETS.

Bismuth subnitrate	22 gr.
Precipitated chalk	22 „
Magnesium carbonate light	15 „
Sugar of Milk	10 „

Mix and divide into 6 tablets.

SKIN AND BLOOD MIXTURE.

Potassium iodide	40 gr.
Ferri et ammon citrate	2 dr.
Magnesium sulphate	2 „
Acid sulphuric dil	½ „
Syrup	1 oz.

Chloroform water to make 8 oz.

Mix.

Dose:—A teaspoonful in water, after food. Effective in cases of skin eruptions, eczema, etc.

CORN SALVE.

Salicylic acid	6 dr.
Methyl salicylate	2 „
Wool fat	2 „
Yellow beeswax	2 „
Benzoatel lard	11 „

Mix all the ingredients thoroughly in a mortar.

LIVER PILLS.

Podophyllin	½ gr.
Rhubarb	2½ „
Extract of hyoscyami	2 „
Mucilage of tragacanth	q.s.

Triturate the ingredients in a mortar and make into a stiff dough. Then make into pills. The above composition is sufficient for one pill.

SYRUP VASAK (I.P.L.)

Liquid Extract Vasaka	500 c.c.
Glycerin	100 c.c.
Simple syrup sufficient to produce	1000 c.c.

Mix the liquid extract of vasaka with the glycerin and add enough syrup to make the product measure 1000 c.c. Mix thoroughly.

Dose:—30 to 60 minims.

COMPOUND POWDER OF KALADANA

Kaladana, in fine powder	700 grms.
Potassium acid tartrate finely powdered	700 „
Ginger, finely powdered	600 „

Mix.

Dose:—60 to 90 grams.

Recipes for Small Manufacturers

RAT POISON.

White arsenic	1	oz.
Tallow	2	,,
White flour	6	,,
Prussian blue	5	gr.
Wheat flour to make up to	1	lb.

Aniseed oil sufficient to give a faint smell to the bait.

Melt the tallow and pour quickly on to the dry ingredients which have been well mixed previously, stirring well until a stiff paste is produced. Then add the oil of aniseed.

MACASSAR HAIR OIL.

Sweet Almond oil	24	oz.
Alkanet root	1	,,
Origanum	1	dr.
Rosemary	1	,,
Oil of nutmeg	15	mins.
Oil of neroli	6	,,
Musk essence	4	,,

Take the almond oil in a jar and put into it the alkanet root. Close the mouth of the jar and set aside for two or three days. Then strain. Now mix the other ingredients in the order given in the recipe. Keep the oil for a fortnight when it will be ready for use.

SPECIAL GUMS.

Certain sizes or gums for stiffening are used in shoe manufacture. Of these, the boxtoes gum is a prominent example. The followings are two formulas.

I.

Dextrine	10 parts.
Talc	10 parts.
Zinc oxide	3 parts.
Water	20 parts.
Cina clay	10 parts.
Water	20 parts.

II.

Chalk	15 parts.
Ground mica (80 mesh)	18 parts.
Dextrine	45 parts.
Water	35 parts.

In the above a little more water than is specified should be used to dissolve the dextrine, and into this solution, which is apt to be heavy unless very hot, are incorporated the other ingredients a little at a time.

WHITE ANT KILLER.

Orthodichlorbenzal	24	parts.
Solvent Naphtha	45	,,
Betanaphthol	4	,,
Rosin	4	,,
Rect. spirit	7	,,

Mix all together and keep in air tight inversion bottles.

PHOTO MOUNTING PASTE.

Powdered gum arabic	1	oz.
White dextrine	4½	,,
Water (boiling)	1	pint.

Take the powdered gum arabic and mix it with the dextrine. Then add 1 pint of boiling water, a little at a time, and then boil the mixture in an enamelled pan for about 15 minutes. Allow to cool; add ammonia 60 drops.

CARBOLIC SOAP.

Coconut oil	80 lbs.
Tallow	40 lbs.
Caustic soda lye (38°Be)	60 lbs.
Phenol	3 lbs.

Melt the coconut oil and tallow together by gentle heat. Then raise the temperature of the mixture to 35°C and stir in the caustic soda lye. Continue stirring until the soap becomes sticky. Now dissolve the phenol in a little water and crutch well into the soap. Perfume the soap if desired with a little clove oil, lavender or rosemary oil. When the soap sets hard cut into tablets and wrap in an air-tight package.

TABLE SAUCE.

Vinegar	1	qrt.
Powdered pimento	2	dr.
Powdered cloves	1	,,
Powdered black pepper	1	,,
Powdered mustard	2	oz.
Powdered ginger	1	dr.
Common salt	2	oz.
Shallots	2	,,
Tamarinds	3	,,
Sherry wine	1	pint.
Capsicum	1	dr.

Mix all together, simmer for 1 hour and strain it, and fill in bottles.

This sauce is never quite clear; straining to remove the coarser particles is all that is necessary.

In the Field of Invention

NEW NON-TWISTED THREAD.

It is recently announced by Richard T. Kroff, Director of Research of the Building Corticelli Inc. of Putunam, Connecticut. U.S.A. the first successful production of non-twisted thread. The new thread is called monocord, and is neither a monofilament nor a coated or a re-treated thread. It is produced by a radically new process which eliminates the spirals and ridges of the traditionally twisted thread. Certain claims are made for it. It will not kink snarl, split or ravel. It exhibits exceptional sewing qualities, and can be manufactured with almost any fibre, synthetic or natural. Although no details of the manufacturing process have been released, monocord is made up of an untwisted bundle of fibres which have been welded together so that they form a thread of one cord with all the properties of the original fibres of which it is made.

—JUTE & CANVAS REVIEW.

XYLOL-FORMALDEHYDE RESINS.

War-time investigations in Germany on xylol-formaldehyde resins are described. In producing these resins, the capacity of aromatic hydrocarbons to condense with formaldehyde in the presence of acids is taken advantage of. Sulphuric acid is preferred to hydrochloric acid in the process.

Xylol is first converted to the corresponding unstable derivative of benzyl alcohol which, in the presence of an excess of hydrocarbon, gives rise to diphenylmethane. High temperature and high concentrations of acids favour the reaction. A second reaction takes place under milder conditions, yielding a formaldehyde acetal in the presence of excess of formaldehyde. This acetal is the dominant constituent of the new resins in their liquid form. The new acetals behave as sources of free formaldehyde and are capable of condensing with phenols to form resins possessing valuable properties.

These resins are water soluble but can be made water insoluble. The water soluble xylol-formaldehyde resin applied as a film with the addition of cobalt, lead or manganese naphthenate dries completely in 12 to 24 hr. In admixture with ordinary drying oils, the oxidative drying oils, of the new resins takes place particularly readily. These resins find application : leather oils, as a basis of a glaziers' putty, a for certain special purposes in the textile a lacquer industries.

—JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARC

STEROLS FROM WOOL FAT.

A recent patent taken out by a Netherlan worsted yarn-spinning mill relates to an i proved method for separating sterols, e g. chol sterol, from the liquors obtained in wool-was ing. The sterols may subsequently serve basic materials for the manufacture of vitam D and some hormone preparations.

The unsaponifiable portion of wool fat heated in the presence of a metal salt, e.g. anh drous addition product is treated with a solve e.g. acetone, whereby the addition product partially or entirely dissolved. The method, is claimed, is economical and gives a high yield of sterols.

RADIO ACTIVE ELEMENTS AND MEDICINE AND INDUSTRY.

British scientists have established that t mixing radio-active atoms of phosphates wi ordinary fertilizers, it is possible to see ho the plant uses the fertilizer with which it is fe By mixing radio-active carbon dioxide with ord nary carbon dioxide one can study the meth by which plants turn carbon dioxide into fo under the influence of sunlight.

In the same way, with radio-active and ord nary iodine it is possible to trace where th iodine is going to when treating the thyroi gland. Radio-active phosphorous can be use to determine the volume of blood in the bod and also for testing how the body utilises bloo

Radio active elements can help industry i many ways. In the oil industry a little radi active carbon introduced into crude oil enabl it to be followed in its wanderings round th chemical plant. Metallurgists are making i creasing use of this process in studying the ra at which bearings are being worn.

By means of the atomic pile new element which have not existed on the earth before ca be produced.

Formulas, Processes & Answers

ZARDA.

1634 K.P.G., Khagra—Desires to learn the method of making zarda.

Hingli Tobacco	1	seer.
Cumin Seed Black	1	"
Aniseed	1	"
Coriander Seed	1	"
Musk	1	"
Water		q.s.

Remove the stalks and ribs of the hingli tobacco and bake over a moderate fire. Then powder the leaves finely. Meanwhile bake the spices and have them also finely powdered separately. Mix these ingredients together and add the musk, previously macerated in water. Then moisten with water and macerate the mass well. Next strain the mass with sufficient water through a clean cloth to get a pulpy extract of ingredients. Spread the mass over a porcelain dish and dry in the sun to form a cake. Break the cake into granules or quids.

BRILLIANTINE.

1652 P.G.P., Tadpatre—Wishes to have a good formula of brilliantine.

Spermaceti	500	parts
Refined Castor oil	500	"
Benzoated lard	200	"
Rose oil	1	part.
Rose Geranium oil	4	parts.
Petitgrain oil	5	"

Melt the spermaceti and lard over water bath. Then remove from the source of heat and add the castor oil and then the essential oils. Mix and pour in pots.

RHODAMINE.

1672 R.H.K., Banaras—Wishes to know the process of preparing rhodamine.

Diethyl-meta-amido-phenol	5	grams.
Phthalic anhydride	9	"
Anhydrous zinc chloride	6	"

Mix the first two ingredients in a mortar and then transfer the mixture in a nickel crucible, which is heated in an oil-bath. Next raise the temperature slowly to 100°C, withdraw the flame, and add the powdered zinc chloride, the whole being well stirred. Then raise the temperature gradually to 180°C; the water vapour is given off and the reaction is finished when a sample withdrawn by a glass rod completely solidifies on cooling. This takes about 4 to 5 hours. When cold reduce the solid product thus obtained to fine powder and boil with alcohol on a reflux condenser. Filter the alcoholic solution and allow to stand for some time so as to allow the crystals to settle. Then filter and dissolve the crystals in a small quantity of water acidified with dilute hydrochloric acid and the solution so obtained is allowed to cool, when the hydrochloric separates out, and is filtered, and dried on a porous plate.

COTTON SIZINGS.

1676 G.B.M., Kolhapur—Wish to have recipes of cotton sizings.

I.

Sago	31	parts.
Farina	59	"
Tallow	8	"
Soap	2	"
Mix.		

II.

Wheat flour	91	parts.
Tallow	9	"

LEMON JUICE.

1679 B.S., Hoshangabad—Desires to have a process of preparing lemon juice.

To prepare lemon juice cut each lemon into two or more pieces, place the pieces in cloths between rocks and press it. The yield of juice ranges from 35 to 40 per cent.

A large proportion of oil is included, but is removed by passing the juice through a separator, which at the same time removes some of the suspended material.

Next the juice should be sterilized by heating at 70°C for 30 minutes. There is very little loss of flavour. When kept at a low temperature, it retains its rich lemon flavour for many weeks, and if frozen quickly it will keep for a long time. Eventually, however, a peculiar flavour similar to a lime flavour seems to develop. The exclusion of all air in this juice is important, but even this exclusion was not successful in controlling the change of flavour:

ARTIFICIAL ROSE WATER.

1683 N.J.V., Murtizapur—Wishes to know process of preparing artificial rose water, nail polish, etc.

Rose oil	40	grams.
Clove oil	4	"
Alcohol to make	3½	fl. oz.
Distilled water	35	" "

Mix the first two ingredients and add alcohol to make 3½ fl. oz. Now mix the spirituous liquid with 35 fl. oz. of boiling distilled water and allow to stand until it has undergone the viscous fermentation and blend producing a stuff superior to most of the commercial waters.

The above recipe avoids the necessity of listilling rose petals and yields rose water of atisfactory quality on simply mixing of the ngredients mentioned in the recipe.

NAIL POLISH.

Celluloid film, cut small	200	gr.
Amyl acetate	2	oz.
Acetone	5	oz.
Spirit red	80	gr.

Clean the celluloid film by soaking it in oda solution for 2 or 3 hours, then scrape with blunt knife. Dry in the sun. Then cut it into mall pieces and weigh out and put in the mixture of acetone and amyl acetate in a well-toppered bottle. Then add the colour. Keep side for a day or two; then strain and bottle.

BINDI.

Gum arabic	10	oz.
Carmine	15	"
Rose water	16	"
Distilled water	1	quart.

Macerate the first two ingredients in a stone mortar with sufficient rose water to make into thin paste. Then put up in phials for use.

ARTIFICIAL TEETH.

1696 S.S., Fatehgarh—Desires to learn a rocess of making artificial teeth.

To make artificial teeth grind felspar and uartz to an impalpable powder, together with certain amount of kaolin. Then make the ixture into a thick paste with water and tint a variety of colours by means of titanium ioxide or by the use of salts of cobalt, uranium, anganese, etc. Next press the paste in moulds which are inserted platinum pins. Then urn the teeth in saggers until well vitrified, a mperature of about 48°C being required. hey are then covered with an enamel made of e some materials as the body of the tooth, but ixed in slightly different proportions.

In order to secure a satisfactory match with patient's natural teeth, the dentist some times pplies a small additional quantity of glaze of suitable but to the front of the teeth and refills em in a special muffle.

OT-POTIA.

1699 B.S., Purabsarai—Desires to know a rmula of preparing pot-potia.

This is a very amusing piece of fireworks. hen scratched on the pavement it gives off a ntinuous series of little explosions.

Mix 5 kilograms of powdered gum arabic ith 5 litres of water, adding water gradually ith constant stirring. Then add 1½ kilograms magnesium carbonate. Place this on a water th with a thermometer arranged so that the mperature can be carefully observed and heat 50°C after which add one kilogram white phosphorus and stir until entirely melt. Continue stirring while cooling to 25°C ter which add a mixture of 2½ kilograms red ochre and 3 kilograms potassium chlorate and stir cautiously until a perfectly smooth product results after which it may be poured in paper moulds in the manner described below.

Secure a number of boards of ¾" material and bore holes into them ½" deep and 1½" diameter. Turn up a puncher which will work easily in the holes. Cut some red tissue paper of good quality into circular pieces 2½" diameter. Lay them over the holes in board and punch in. Pour into those the composition and fold over the edges of the paper. Allow to set and when hardened they may be removed and thoroughly dried when they will be ready for use. In preparing this firework great care must be used to prevent accidents as the mixture containing phosphorous and potassium chlorate are liable to ignite on rough handling.

KULPI-BARAF.

1739 B.C.R., No address—Wishes to learn the process of making Kulpi baraf.

The principle of making Kulpi baraf is as follows:—

Kulpi Baraf is the Indian modification of ice cream which is a foreign dish. It is specially welcome in the hot season. The ingredients entering into its composition are milk, fruit juices, sugar and ice. Those prepared of sweetened milk, rabri, are known as Malai Baraf and are most relished. Those from fruits or different syrups are also really enjoyable.

The underlying principle of preparation is as follows:—Some pounded ice is put in a suitable bowl, a handful of common salt is strewn over and mixed with the ice. By this means a freezing mixture is made. Ice will not melt soon, and moreover, the melting temperature or freezing point will be comparatively lowered. Some cone-shaped tin moulds are procured. These must have also circular lids of tin plates to cover the mouths. The desired stuff is put into such containers and the lids are closed and sealed with a putty made of flour and water. The containers are next arranged in a bowl over a layer of pounded ice. They are then surrounded with and immersed in the freezing mixture. The bowl is covered up with a blanket and shaken intermittently. The Kulpi Baraf will be ready when the contents become solid and frozen.

In practice the requisites necessary for the manufacture of kulpi baraf are a few pewters, glass or earthen vessels for the storage of water, salt, or other chemicals, sugar, or syrup, milk, fruit juices, 2 large syrup boiling pans, strainer for filtering the fruit juices, a fruit peeler or one silver-plated knife for peeling the fruits, a wooden or brick built ice-chest, some conical

tin or pewter cones hermetically sealed at the short ends, 4 to 12 inches in length or which will hold 3 to 24 ozs of ice cream, some round thin tin or pewter discs to fit exactly the larger ends of the above cones, a pound or more of flour to make a paste with lime or water for cementing those lids temporarily, a large and stout earthen handi, a balance with weights, a few measure glasses, a syrup gauge, a few more aluminium or pewter vessels for keeping and mixing the various ingredients, 2 or 3 large pewter spoons, and a few other sundries. Lemons should be kept in large quantities also. There is a kind of cheap ice-cream making machine or freezer on the market now-a-days. But the kulpi baraf prepared by this is far inferior to that made according to the indigenous method. In the machine or freezer the resulting product does not become so solid as in the indigenous method. It may be that by renewing the mixture of ice and salt and by twice freezing, the machine-made article may become solid and somewhat better results may be expected.

Malai.

Malai	2	seers.
White Sugar	6	ch.
Rose water	½	„

Take pure milk, boil it down to half. Mix the white sugar into it and add good rose water. Put into the tin cover, close the mouths and immerse in the freezing mixture.

Lemon.

Lemon Juice	½	seer.
White Sugar	½	„
Water	1	„

Bring to a boil 1 seer of water in an earthen ware vessel. Dissolve the sugar; when it is thoroughly mixed pour in the juice. Remove after 5 minutes. Allow to cool and then proceed as in Malai Baraf.

Almond.

Almond	½	seer.
Milk	2	seers.
White Sugar	4	ch.
Rose Water	1	„

Steep the almonds in water for some time; rasp them to free the skins. Bray into a paste. Now bring to a boil 2 seers pure milk, stir in the almond paste and white sugar. Stir vigorously and allow to cool. Mix good rose water. The contents may be coloured by adding saffron in the boiling milk.

HAIR REMOVING SOAP.

1753 S.P.J., Delhi—Wants to have a formula of preparing hair removing soap.

To prepare hair removing soap first of all prepare the stock soap in the following manner.

Stock Soap.

Coconut oil	900	grams.
Caustic soda lye (10°Be)	600	„
Caustic soda lye (20°Be)	375	„
Common salt	375	„

Boil the 10°Be lye in a porcelain vessel, and gradually add the oil without stopping the heating. When the mixture has become smooth add 375 grams of caustic soda lye (20°Be). The mass now becomes thicker; the heating is stopped when a small sample solidifies on cooling. About 500 gms. of water is then added, the whole heated to boiling and 375 grams of common salt added, when the soap will separate and rise to the surface. The mixture is then cooled, the water poured off, the mass mixed twice with a 20 per cent. salt solution, and finally with cold water. The water is allowed to drain off in a hair sieve and the mass pressed to remove the excess of water. The soap so obtained is in the form of paste.

Now weigh out the soap base and gently warm it whereby it melts. At this stage incorporate the starch and barium sulphide in the proportion specified in the recipe and put in moulds.

Soap base	2	seers.
Starch	1	seer.
Barium sulphide	2	seers.

ELECTRIC INSULATING TAPE.

1764 B.I., Lucknow—Desires to know a process of manufacturing electric insulating tape.

Motan or Carnauba wax	40	parts.
Rosin	32	„
Castor oil	15	„
Carbon black	8	„

Melt the wax and rosin and then add the castor oil. Lastly thoroughly incorporate the carbon black, while the mixture is still but treat the tape by simply dipping for a few seconds.

PRESERVING MANGO.

1767 P.B.N., Ranchi—Wants to have a method of preserving mangoes.

Mangoes can be preserved fresh for a pretty long time if green and fully matured mangoes are kept in cold storage taking care that the gum oozing out of the stalk end soon because it develops brown spots on the fruit. The clean fruit is then wrapped with tissue or wax paper and put in a packing box. A wooden crate of the size 24" × 12" is capable of holding about 100 mangoes. As wrapping the fruit individually is harmful and the packing material like rice straw affects the ripening of the fruit to a certain extent after cold storage, wrapping fruit individually and packing it tightly with rice straw should be avoided, using only a light

wadding of the packing material to hold the fruit in position and to minimise bruising in handling the packages. The packed fruit is then put into cold storage. This will surely extend the life of mango.

MANGO SQUASH.

Peel fully ripe mangoes and remove all blemishes. Rub the peeled mangoes against a coarse sieve to get up pulp and reject the pit. Then pass the pulp through a fine sieve or muslin cloth to get fine juice pulp and also to get rid of fibres if any. The pulp thus obtained is ready for squash making. This pulp, if desired, can be used in the preparation of ice cream.

To make the squash the following ingredients should be mixed in proportions as given below:—

(1) Mango pulp	1 lb.
(2) Sugar	1¼ „
(3) Water	1 „
(4) Citric acid	¼ oz.

(5) Orange Colour: Sufficient to give attractive colour.

Weigh out the calculated amount of sugar, acid and water and make solution by warming. While still hot add the colour. Remove any scum which comes on the solution and pass it through a thick cloth to remove insoluble impurities if any. Cool this solution and add the requisite amount of mango pulp or juice. The squash thus obtained may be preserved either by adding a chemical preservative (potassium meta-bisulphite) at the rate of ¼ ounce per 100 lbs. of mango squash or by pasteurizing the squash at 212°F. (boiling water) for 30 minutes.

SNOW.

1769 M.H.A.J., Belgaum—Wishes to have a formula of preparing snow.

Stearic Acid, triple pressed	1¼ lbs.
Cetyl alcohol	1 oz.
Sodium carbonate	2 „
Borax	4 „
Glycerine	¼ lb.
Alcohol	6 oz.
Water	58¼ „
Perfume	½ „

Dissolve sodium carbonate and borax in half the quantity of water and add glycerine. Melt the stearic acid and cetyl alcohol. Heat both the solutions to 80°C and add the alkali solution to the fat solution gradually with steady stirring. Continue agitating till emulsification occurs. Perfume at 40°C.

The perfume compound may be made by mixing 9 parts of geramium oil (African) with 1 part of patchouli oil.

CLARIFYING HONEY.

1773 S.A.R.A., Patna—Wants to have a process of clarifying honey.

For 8,000 parts of fresh honey, take 875 parts of water, 150 parts of washed, dried, and pulverized charcoal, 70 parts of powdered chalk, and the whites of 3 eggs beaten in 90 parts of water. Put the honey and the chalk in a vessel capable of containing ¼ more than the mixture and boil for 3 minutes: then introduce the charcoal and stir up the whole. Add the whites of the eggs while continuing to stir, and boil again for 3 minutes. Take from the fire, and after allowing the liquid to cool for a quarter of an hour, filter, and to secure a perfectly clear liquid refilter on flannel.

ENAMELLING COPPER WIRE.

1786 V.L., Bombay — Wants to have a method of enamelling copper wire.

To enamel copper wire suitable for electrical purposes first prepare an insulating composition by melting 2 parts of asphalt together with 2/5 part sulphur and adding to this mixture 5 parts of linseed oil varnish. Next keep the temperature of the whole at 320°F for 6 hours. After this allow it to cool. When cold add oil of turpentine sufficient to make the mass as thin as syrup. Now stretch the well cleaned copper wire and apply this composition evenly by means of a brush or other suitable arrangements. When dry beautiful black lustrous elastic enamel produces over the wire. When transparent colourless enamel is required coat the copper wire with shellac varnish prepared with linseed oil containing a little castor oil; of course the varnish should be prepared with bleached shellac.

PRINTING INK.

1787 R.S.I., Rajahmundry—Wishes to know a good recipe of printing ink.

Castor oil	15.9	parts.
Linseed oil printing varnish	22.1	„
Stearic acid	26.6	„
Turpentine oil	35.4	„
Lampblack	q. s.	

Grind all together in a paint mill until a homogeneous mass is formed.

For other shades use oil soluble aniline dyes.

REFINING MUSTARD OIL.

1812 H.L.R.P., Patiala—Desires to learn a process of refining mustard oil.

In clarifying and refining the oil, sulphuric acid may be used with profit. From 1 to 2 parts of sulphuric acid is added to the 100 parts of the oil with brisk agitation. The temperature of the oil should not be allowed to exceed 40°C when the acid is intermixed. The oil is then allowed to rest for 24 hours. Then 60 to 70 parts of warm water at about 60°C. is well mixed with the oil and the whole is then set aside for some days. A watery acid liquor separates at the bottom with a layer of flocculent "floods" above which is the clarified oil. Finally draw the oil off and wash with warm water by stirring well to remove residual matter.

AUTO-VALVE GRINDING COMPOUND.

1903 M.A., Bombay — Wishes to have a recipe of auto-valve grinding compound.

Ceresine	5	parts.
Tallow	2	„
Oleic acid	30	„
Mineral oil	10	„
Carborundum, finely powdered	53	„

Melt the first four ingredients at 80°-90°C. Then mix in the carborundum in small portions at a time. Stir until cooled to sufficient viscosity.

TABLE SALT.

1922 V.C.A.M., Cheyur—Wants to have a process of making table salt.

To make table salt dissolve lump rock salt in four times its weight of water, filter, and then drop into the filtered solution first chloride of barium and afterwards carbonate of soda as long as any precipitate falls. Then filter and evaporate the clear fluid very slowly until crystals begin to appear. When this condition has been reached set aside the solution for a day. The crystals are taken out, dried and kept bottles.

MAGNESIUM SULPHATE.

Magnesium sulphate may be obtained from dolomite. For this purpose break the mineral into fragments, and heat them with a sufficient quantity of sulphuric acid to convert its carbonates into sulphates. Treat the fused mass with boiling water whereby the magnesium sulphate is dissolved out. The solution so obtained is evaporated to half the volumes and set aside to crystallise, when crystals of magnesium sulphate is produced.

SEALING WAX.

1945 M.I.W., Madura—Desires to have a good recipe of sealing wax.

Shellac	4½	lbs.
Rosin	1½	„
Turpentine Oil	½	lb.
Barytes	3½	lbs.
Vermillion	½	lb.

Melt the first three ingredients over slow fire. Then incorporate the remaining in materials. Stir when the mass becomes homogeneous, it is taken out by means of a ladle and poured into brass moulds well smeared with turpentine oil to prevent sticking. After cooling open the moulds and take out the sticks. The ends are rounded off by a small flame and the surface is given a bright polish, by holding the sticks at a distance over a fire for a few minutes.

DISINFECTING FLUID (GOOD QUALITY).

1929 M.T., Farrukhabad—Desires to have a formula of preparing good type of disinfecting fluid.

Rosin	10	lbs.
Sulphonated castor oil	4	„
Caustic soda	1	lb.
Caustic potash	1½	lbs.
Chlorinated cresol	1½	gallons.
Chlorinated phenol	½	lb.
Soft water	5	gallons.

First of all dissolve the caustic soda and caustic potash in 2 gallons of water. Keep aside to cool. Next melt the rosin over slow fire and mix the sulphonated oil. Reduce the fire and slowly but cautiously pour the alkali soution. Stir and heat gently until the soap is formed. Put down the fire and allow the mass to cool almost to room temperature. Then mix the chlorinated cresol and chlorinated phenol one by one. Stir and then mix the remaining 3 gallons of water. Keep in a well closed drum for a couple of days. Then fill in bottles.

AGARBATTI.

1960 B.D.M.I.,Calcutta—Wants to have a good recipe of agarbatti.

Benzoin	100	parts.
Tolu balsan	50	„
Charcoal	700	„
Saltpetre	50	„
Sandal oil	50	„
Patchouli oil	15	„
Cascarilla oil	30	„
Grain Musk	5	„

Mucilage of acacia, a sufficient quantity to make thick syrupy consistency. To make sticks dip into this dry splinders of bamboo and expose them vertically in the sun to dry.

Brief Queries and Replies

Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge in serial order. Questions are replied by post on receipt of As. 8 stamps for each question. Subscribers outside India are requested to send two International Reply coupons for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.

5 S.P.S., Abdullapur—You have to use wood working machines for manufacturing wooden photo frames. For machines enquire of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta and Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta. Process will appear in due course.

6 K.M., Chandausi—Process of manufacturing all kinds of inks will be found in Manufacture of Inks published from this office, price Rs. 3-7 including postage. There is no arrangement for imparting practical training at present.

8 P.C.I.L., Calcutta—You may start an oil mill and along with it vegetable ghee manufacturing factory. There is good demand for edible oils in India. As regards medicinal oils such as chalmoogra oil and olive oil these have good prospect. Government of India are gradually withdrawing restriction of oilseed export.

9 S.E.W., Arrah—We are not aware of the address of Telsen.

10 M.C.C., Batala—For graphite enquire of Patna State Graphite Mining Co., Titilagarh, Patna State and Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta.

11 W.R.U., Umarkhed—For ice making machines enquire of M. S. Vernal & Co., Bharat Insurance Bldg., Chittaranjan Avenue, Calcutta and Sulzer Brothers Ltd., 8, Netaji Subhas Road, Calcutta. Machine suppliers will guide you for starting the factory and working the machines.

13 K.K.M.B., Benares—For irons enquire of L. C. Saha Ltd., 20D, Lindsay Street; N. B. Sen & Bros., 11, Esplanade East and C. C. Saha Ltd., 170, Dharamtala Street, all of Calcutta.

14 H.R.I., Nellore—For plastic making machineries and chemicals enquire of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

15 K.S., Jaipur—It is not possible to make a solution of mother of pearl.

16 S.M., Dalmianagar—We have no book on photo developing and printing. A good formula of washing soap appeared in September 1948 issue of Industry.

17 M.G.S.S., Aligarh—Process of manufacturing snow cream, bindi, etc., will be found in Manufacture of Toilet Goods by H. L. Halder published from this office, price Rs. 4-7 including postage. Formulas of metal polish and hair removing oil will appear in due course. A formula of good washing soap appeared in September 1948 issue of Industry.

18 S.S.C., Kakinada—Soap making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. [illegible] chines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

19 M.I., New Delhi—For ice candy machines enquire of Blue Star Engineering Co., 3, Chittaranjan Avenue and Refrigerators (India) Ltd., 59C, Park Street, both of Calcutta. Process of manufacturing ice candy will be found in Manufacture of Syrup and Cold Drink published from this office, price Rs. 3-7 including postage.

20 B.M.K., Bhusawal—For industrial machines enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta and Prabartak Commercial Corporation, 61, Bow Bazar Street, Calcutta.

22 H.D.S., Durgapur—Address of Kateja Sonamarts is opp. Gangamata Mandir, Gopalji Road, Jaipur. You may consult Eastern Philatelic Journal, Post Box No. 10, Madras. Present address of German Industrial Echo is not known.

23 K.S., Palakol—Following is a recipe of pain killer:—Yellow vaseline 10 parts; methyl salicylate 2 parts; oil of cajuput 2 parts; oil of eucalyptus 2 parts; menthol 2 parts; camphor 2 parts; wool fat 20 parts. Mix thoroughly in a stone mortar and put in wide mouthed bottles. It may be rubbed gently over the affected parts.

26 N.C., Calcutta—Bread and biscuit making machines may be had of Small Machinery Mfg Co., 22, R. G. Kar Road, Calcutta.

27 N.S.H.C.C., Patna—For cycles and cycle parts enquire of Bentinck Cycle Co., Ltd., 1-2 Chowringhee Road; H. D. Nundy & Co., 50-6 Dharamtala Street and Bimal Bros., 1-B, Chowringhee; all of Calcutta. Following is a list of calendar printers: Calcutta Printing Co., Ltd., 98-4, Surendranath Banerjee Road; Eagle Lithographing Co., Ltd., 26, Christopher Road and Tower Halftone Co., 14C, Kapalitola Lane; all of Calcutta.

28 V.M.M., Hirakund Camp—Process of developing printing photo will appear in due course.

29 J.N.S., Kanpur—For dal making machine enquire of Prabartak Commercial Corporation, 61, Bow Bazar Street, Calcutta and International Trading Co., 14, Netaji Subhas Road, Calcutta.

30 M.T., Mysore—Moisten camphor powder with rectified spirit then compress to tablets by means of pressure.

31 M.T.L., Pattambi—Process of dyeing leather appears elsewhere in this issue.

32 B.P.G., Mahamadpur—Ammonium carbonate may be had of Banshidhar Dutt, 126, Khengrapatty, Barrabazar, Calcutta.

33 S.A.J., Kurnool—Process of manufacturing all kinds of soap will be found in Manufacture of Soap published from this office, price Rs. 3-7 including postage. Process of manufacturing hair oil and snow will be found in Indian Perfumes, Essences and Hair Oils published from this office, price Rs. 3-7 including postage.

34 M.B.S.K., Gujranwala—Process of manufacturing slate and lead pencils will appear in due course.

35 N.E.W., Lucknow—Refer your query to A. Mitra & Co., 5-2F, Raja Rajbullav Street, Calcutta.

36 M.A.A., Kothapeta—For ebonite rods enquire of Rubber Products Ltd., Dudheshwar Road, Ahmedabad and Universal Traders, 92, Harrison Road, Calcutta.

37 Y.V., Nellore—Plastic making machine and raw materials may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road and Francies Klein & Co., Ltd., 1, Royal Exchange Place, both of Calcutta.

38 D.R., Dehra Dun—For automatic candle making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

39 H.J.F.B., Podanur—You should use molasses as binding agent for making cubes of charcoal.

42 S.P.J.C., Ajmer—Refer your enquiry to the Controller of Imports, New Delhi.

44 E.B.S.W., Rajshahi—Hard paraffin is melted and poured in candle making moulds fitted with wick. Candle making machine may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. Hard paraffin may be had of Burmah-Shell Oil Storage and Distributing Co., Ltd., Hongkong House, Dalhousie Square, Calcutta.

45 R.A.S., Baroda—Process of photo printing and developing will appear in due course.

47 K.P.C., Jodhpur—Refer your query to The Indian Journalists Association, P4, Ganesh Chandra Avenue, Calcutta.

49 J.R., Nigeria — Following is a list of shoe dealer: Globe Tannery, No. 31-9, Lower Chitpur Road, National Factory, 81, Bentinck Street, Sadake Shoe Factory, 24, Lower Chitpur Road, and Young & Co., 41, Chittaranjan Avenue South, all of Calcutta.

50 J.S., Sajjanpur—We have no book on canning industry. You may however enquire of Thacker Spink & Co. (1933) Ltd., 3, Esplanade East, Calcutta. For machines enquire of Marshall Sons & Co. Ltd., 99, Netaji Subhas Road and Francis Klein & Co. Ltd., 1, Royal Exchange Place, both of Calcutta.

51 S.R.B., Dehra Dun — For packing materials enquire of Packing Box Manufacturing Co., 26A, Wellesley Street, Calcutta and Beliaghata Packing Box Manufacturing Co., 283, Chaulpatty Road, Beliaghata, Calcutta. There is no restriction on packing materials.

52 N.I.C.I., Chandausi—For the chemicals you require enquire of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta. For moulds for rubber dolls enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta. Collapsible tubes may be had of Metal Box Co. of (India) Ltd., B2, Hide Road, Kidderpore, Calcutta.

58 K.L.M.S., Delhi—By treating bones with sulphuric acid the calcium phosphate is converted into a soluble form so that growing crop may take up the phosphoric acid immediately. *Dissolved bones not only contain* soluble but also insoluble phosphates. These insoluble phosphates decompose gradually in the soil, afford a constant supply of nourishment to plants during growths and are therefore of great importance to the farmer. Dissolved bones are useful for fast crop. They supply the land with phosphoric acid and nitrogen. Other processes you require will appear in due course.

59 P.T.C., Madura—For foot rule making machine enquire of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta and Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta.

61 P.S.K.S.C., Kumbakonam—Process of manufacturing superphosphate, sulphur and sulphuric acid will appear in an early issue of Industry.

63 R.S.C., Bombay—Process of manufacturing rubber goods will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage.

64 S.L.S.P., Rajamundry — For woven labels enquire of Hall & Anderson Ltd., Chowringhee, Calcutta and Paul & Co., 100/1, Grey Street, Calcutta.

65 G.M.H., Ludhiana—For collapsible tubes enquire of Metal Box Co. of India Ltd., B2, Hide Road, Kidderpur, Calcuta. Price of Industry Year Book & Directory for 1948-49 is Rs. 12/- postage Re. 1/- extra.

66 M.M.G.S., Bharatpur—Address of Dadruvinas is not known.

67 R.F.G.S., Karachi—It is not possible to manufacture soap with cotton seed oil only. You have to use coconut oil in small proportion. It

is advisable for you to seek services of an expert who will work in your factory. We have no other book on soap manufacture than the one you have already got.

68 P.C.W., Ludhiana—See under No. 65 above.

69 R.K.A., Ramnad — For German Silver Sheet and wire enquire of Jagarnath Prosad Sreenath, 93, Lower Chitpur Road, Calcutta and Devidas Shital Prosad, 82, Lower Chitpur Road, Calcutta.

71 P.K.C., Kottayam—It is not possible to make betel leaf essence.

73 M.G., Jaipur—For tak making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension and Alfred Herbert (India) Ltd., 13-3, Strand Road; both of Calcutta.

74 S.S., Hoshiarpur—For the machines you require enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcueta; Marshall Sons & Co. Ltd., 99, Netaji Subhas Road and Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta.

75 O.P.K., Meerut Cantt—An article on shuttlecock manufacture appeared in February, 1949, issue of Industry.

76 R.S.D., Dacca—Following is a formula of ink stain removing fluid: Citric acid 1 part; distilled water 10 parts; concentrated solution of borax 2 parts. Dissolve the citric acid in the borax solution. Apply to the paper with a delicate camel hair pencil removing any excess of water with a blotter. Then apply a mixture of oxalic and tartaric acid in equal parts, dissolved in just enough water to give a clean solution. No other improved formula of electric sparkler than that already published is available.

77 P.C.C., Banaras—Aniline is a chemical. All the chemicals you require may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta.

79 A.N.T., Faridabad — For naphthalene enquire of H. Momtaz & Co., 1, Colootola Street, Calcutta and Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta.

81 N.I.C.I., Chandausi—For automatic candle making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

83 C.O., Nova-Goa—We have no book on manganese or iron ore. You may enquire of Thacker Spink & Co., (1933) Ltd., 3, Esplanade East, Calcutta for the books required.

88 T.S.B., Bombay—We are not aware of the present address of Mr. K. S. Kapoor.

91 M.P.R., Budaun—For glass tubings and glass slabs enquire of Delhi Glass & Tile Co., Fatehpuri, Delhi; Fotic Lall Seal & Sons Ltd., 10, Swallow Lane, Calcutta and Economic Glass House, 50A, Swallow Lane, Calcutta.

92 B.S.W., Bhagalpur—For calcium carbide enquire of Shaw Wallace & Co., Bankshall Street, Calcutta and Radha Kanto Dass & Sons Ltd., 211, Old China Bazar Street, Calcutta.

93 R.C.P.S., Hoshiarpur—Annually we issue four special numbers of Industry. This is special number on leather industry. Tha[nk] you for your valuable suggestion.

94 S.A., Budaun—See under No. 92.

95 B.E.F.W., Bhagalpur—Bucket maki[ng] machines may be had of Alfred Herbert (Indi[a]) Ltd., 13-3, Strand Road, Calcutta.

96 S.T.C., Surendranagar—Japanese a[d]dresses are not known.

97 B.N.G.S., Coimbatore—Process [of] mending canes will appear in due course.

99 S.V., Lucknow—Process of manufa[c]turing artificial slates will appear in an ear[ly] issue of Industry.

103 M.P., Hyderabad—Process of man[u]facturing hair oil will be found in Indi[an] Perfumes, Essences and Hair Oils publish[ed] from this office, price Rs. 3-7 including po[st]age. A formula of washing soap appears [in] March 1949 issue of Industry.

104 H.I.T., Patna—For textile machi[nes] enquire of W. H. Brady & Co. Ltd., Mercant[ile] Bldg., Lall Bazar, Calcutta. You may cons[ult] Home Industries published from this offi[ce] price Rs. 3-7 including postage. We have ma[ny] other books on industrial line.

105 B.A.S.F., Adirampatnam—Process [of] manufacturing plaster of paris will appear [in] an early issue of Industry.

107 K.V.R., Ellore—Pill making machin[es] may be had of Probartak Commercial Corpor[a]tion, 61, Bow Bazar Street, Calcutta.

112 P.I.L., Dhamangaon—Refer your que[ry] to the Post Master of Local Post Office.

113 H.W.W. Kandy—Formulas of incen[se] powder, face powder, etc., will appear in d[ue] course.

117 P.V.R.C., Rajkot—For envelope ma[k]ing machines enquire of John Dickinson [&] Co., 6, Clive Row, Calcutta; Oriental Mach[i]nery Supplying Agency Ltd., P12, Mission Ro[w] Extension, Calcutta and Record Engineeri[ng] Works, 1st Pathan Street, Bombay.

118 M.L.G., Bilaspur—Rubber goods i[n]cluding tyres and tubes may be had of Dunl[op] Rubber Co. (India) Ltd., 57B, Free Scho[ol] Street, Calcutta; Firestone Tyre & Rubber C[o.] of India Ltd., 28, Chittaranjan Avenue, Ca[l]cutta; Leyland & Birmingham Rubber Co. Lt[d.] 12, Mission Row, Calcutta and J.J.C. Bell Co., 9, Netaji Subhas Road, Calcutta.

119 C.L.D., Bombay—Following is a recipe of School Chalk or Crayon: China Clay 1 part; Precipitated chalk 1 part; Plaster of Paris 2 parts. Water sufficient to form a paste. Now put this in mould and bake over oven.

120 O.P.A., Kanpur—Refer your query to B. K. Paul & Co. Ltd., 1 & 3, Bonfield Lane, Calcutta.

122 S.M.G.W., Firozabad—Process of frosting glass will appear in due course.

125 M.T.C., Kanpur—Process of manufacturing batching soap will appear in an early issue of Industry.

126 S.N.C., Abu Road—An article on plastic industry appeared in December 1948 issue of Industry. Machines and raw materials may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta.

128 Y.Z., Asansol—Process of manufacturing fly paper will appear in an early issue of Industry.

129 T.K.B., Jamshedpur—For photo frame making you may use wood working machines which may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

134 V.S.L.S., Coimbatore—A recipe of ringworm ointment will appear in an early issue of Industry.

135 M.H., Shikarpur—Process of manufacturing sodium carbonate appeared in July 1948 issue of Industry.

138 S.T.C., Calcutta—You may negotiate with the Industries Department of various provinces.

139 S.A.S., Punalur—You have to invest at least Rs. 25,000 for starting pineapple canning industry. For machines enquire of Volkart Bros., 8, Netaji Subhas Road, Calcutta. Tin can making machines may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

141 V.D., Thichinopoly—For obtaining import license you should write to Controller of Imports, New Delhi. Addresses of Japanese firms are not yet known. You may however communicate with Indo-Commercial Corporation, Oomrigar Bldg., Bombay 3. For American addresses you may enquire of American Trade Commissioner, 9-10, Esplanade Mansion, Calcutta.

144 H.G.C., Bombay—Process of coating iron tube with celluloid will appear in due course.

145 S.J.O.M., Dindigul—Following is a list of groundnut oil merchants: S. Ramaswami & Co., Guntur; P. Srinivas Jethalal Singi, Bellary and Sree Krishna Oil Mills, Negapatam.

147 V.P.K.S., Jullundur City—Refer your query to American Trade Commissioner, 9-10, Esplanade Mansion, Calcutta and British Trade Commissioner, Harrington Street, Calcutta.

148 M.R.K., Kotma—For sewing thread enquire of Acme Thread Co., 37, Canning Street, Calcutta. For thread balling machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

150 R.S., Tanjore—We have no book on plastic industry. An exhaustive article on plastic industry appeared in December 1948 issue of Industry.

151 K.S.R., Palakol—Following is a recipe of resin plaster: Rosin 100 grams; Plaster of lead 850 grams; Hard soap 50 grams. Melt together the rosin and the plaster of lead at as low temperature as possible and incorporate the hard soap.

152 A.S.S., Agra—Sometimes shop-soiled books are sold by S. C. Auddy & Co., Ltd., 12. Wellington Street and S. K. Lahiri & Co., Ltd., 54, College Street; both of Calcutta.

153 J.D., Rajasthan—For coniine enquire of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta.

154 D.T.I., Moradabad—Process of manufacturing grinding wheel will appear in an early issue of Industry.

155 C.V.K., Adra—Process of manufacturing luminous paint will be found in March 1949 issue under No. 4268.

156 R.P.P., Davol—Process of manufacturing glue, thymol, etc., will appear in an early issue of Industry.

157 E.T.C., Trichinopoly—Process of manufacturing coffee tablet or extract will be found in March 1949 issue of Industry.

158 K.V.S., Perala—We have no book on mantle manufacture. Process of making mantles will be found in February 1949 issue of Industry.

159 M.S.R., Yeditha—We have no book on paper manufacture including papiermache.

165 S.K.M., Kanpur—Lace making will be profitable. You have to invest at least Rs. 25,000/- for this industry. For machines enquire of W. H. Brady & Co., Church Gate Street, Fort, Bombay.

167 T.R., Aijal—For tobacco cutting machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

169 J.G.P., Bansjora—Mustard seeds produce from 25 p.c. to 33 p.c. oil according to the quality of seeds.

171 B.P.M., Patna—Following is a list of paper mills: Andhra Paper Mills Co., Ltd., Rajahmundry; Bengal Paper Mills Co. Ltd., 103, Netaji Subhas Road, Calcutta; Deccan Paper Mills Co. Ltd., 815-16, Bhowanipeth, Poona; Girgaum Paper Mills, Girgaum; India Paper Pulp Co. Ltd., 8, Clive Row, Calcutta; Lucknow Paper Mills, Lucknow; Oriental Paper Mills Ltd., 8, Royal Exchange Place, Calcutta and Titaghur Paper Mills, Chartered Bank Bldgs., Calcutta. For taking agency you may write to the firms offering your services.

172 D.J.B., Almora—Following is a list of philatelists: Bombay Philatelic Co., Samabaya Chamber, Sir Pherozeshah Mehta Road, Bombay Broad Stamp Co., 7, Hospital Road, Calcutta and Stamp Mart, 163, Dharamtala Street, Calcutta.

173 G.K.W., Ludhiana—Following is a list of silk merchants: B. Motiram, B52, 53, A-29, 30, New Market, Calcutta; Benares Silk Museum, 13-A, Balu Hakkak Lane, Calcutta; Dayaram & Co., G1-5, New Market, Calcutta; Ganga Charan, 201, Harrison Road, Calcutta: For an exhaustive list you may consult Isdustry Year Book and Directory.

174 K.A.A.G., Arni—Tin cans may be had of Bengal Tin Box Mfg. Co. Ltd., 1, Jadu Nath Mitter Lane. Calcutta and Metal Box Co. of India Ltd., B2, Hide Road, Kidderpur, Calcutta.

175 B.B.S., Shahabad—See under No. 174 above.

176 D.S., New Delhi—For trade mark registration write to A. Mitra & Co., 5-2F, Raja Rajbullav Street, Calcutta and Dutta & Co., 82, Harrison Road, Calcutta.

177 S.N., Fatehgarh—We are not aware of any fans worked by Kerosene oil.

178 D.R.N.D., Hissar—You may consult Indian Perfumes, Essences and Hair Oils published from this office, price Rs. 3/7/- including postage.

179 H.T., Karachi—No such dictionary is available. You should negotiate with the following firms for selling herbs: All India Herb Supply Co. Ltd., Goumikh Bhuwan, Masjid Bridge, Bombay 9; Banshidhar Dutt, 126, Khengrapatty Street, Calcutta; Banga Lakshmi Bhandar, 13, Cotton Street, Calcutta and Dawn & Co., 11, Portuguese Church Street, Calcutta.

180 P.V.S.F., Patna—For labels enquire of N. De & Co., 1, Bhim Ghose Bye Lane, Calcutta and Paul & Co., 100-2, Grey Street, Calcutta.

183 D.C.M., Delhi—You may try the prescription of asthma that appeared in February 1949 issue of Industry.

185 K., Adra—Process of manufacturing hair oils will be found in Indian Perfumes, Essences and Hair Oils which you have already got.

187 B.P.G., Saran—Bicarbonate of ammonia may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta.

188 R.L., Ghughli—Plastic moulding machines may be had of Alfred Herbert (India) Ltd., 13-3. Strand Road, Calcutta and Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

189 S.V.S., Cocanada—For learning soap manufacture you may enquire of Soap Training House, 3, Mangoe Lane, Calcutta.

190 H.L., Muzaffarpur—For portland cement you may enquire of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road. Calcutta and Martin & Co., 12, Mission Row, Calcutta.

191 G.B., Achnera—Formulas of depilatory cream, tea tablet and rubber solution will appear in due course.

192 B.V., Siliguri—We are not aware of any institution which gives B.A. degree by postal course and also recognised by Government.

193 S.V.L., Pepsu—Process of manufacturing artificial jasmine will appear in due course.

200 L.E.S., Cochin—For electroplating chemicals enquire of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta.

201 J.W., Ajmer—We have no book on tanning industry. Process of tanning leather appears elsewhere in this issue.

202 M.A.K., Tinnevelly—You may use ultramarine blue in soap.

203 S.M., Agra—For cream separating machine enquire of Edward Keventers Ltd., 11/3, Lindsay Street, Calcutta. For oil extracting machine enquire of Mirrlees Watson & Co., 21, Grosvenor House, Old Court House Street, Calcutta.

206 M.T.A., Budaun—For trade mark registration write to A. Mitra & Co., 5-2F, Raja Rajbullav Street, Calcutta and Dutt & Co., 82, Harrison Road, Calcutta.

207 A.M., Calcutta—No magazine on hosiery industry is published from Calcutta. For hosiery and other allied machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

209 G.O.M.M.C., Ahmedabad—Engler's method of testing sulphonated castor oil is not available.

210 M.L., Tenali—For tablet making machines enquire of Berry Bros., 15, Netaji Subhas Road. Calcutta; Batliboy & Co., Forbes Street, Fort, Bombay and Masseys (1930) Ltd., Royapuram, Madras.

211 R.P.P., Sitapur—You may start an oil mill or a saw mill.

212 Q.A.A.C., Allahabad—You should write to the Controller of Imports, New Delhi for Import License. Following is a list of share brokers: Bengal Share Dealers' Syndicate, 12, Chowringhee Square; East India Stock & Share Dealers Syndicate, 2, Royal Exchange Place and Investment Exchange, 25C, Swallow Lane, all of Calcutta.

214 M.V.R., Hospet—Power laundry machines may be had of Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta.

215 S.N., Bangalore City—You may start honeyed juice manufacture. As regards utensils you may use aluminium wares. Porcelain will also do. Distilling plant may be had of Adair Dutt & Co. Ltd., Stephen House, 4, Dalhousie Square, Calcutta. Glass bottles and corks may be had of Ananta Kumar Ghose & Co., 9, Ezra Street and Bimal Bottle Stores, 130, Radhabazar Street; both of Calcutta.

216 J.N.G., Benares—For black fennel you may enquire of Banshidhar Dutt, 126, Khengrapatty Street, Calcutta. To improve colour of taral alta you should increase the proportion of brilliant crocine. Books on inks, soap, etc., are priced at Rs. 3-7 each including postage.

219 M.R., Arsikere—You may consult The Electrician by V.L.N. Row, published from this office, price Rs. 6/7/- including postage.

220 M.L.S., Amritsar—An article on plastic industry appeared in December 1948 issue of Industry. Plastic powder, mould and machines may be had of Alfred Herbert (India) Ltd, 13/3, Strand Road, Calcutta.

221 M.M.I., Rawalpindi—Process of engraving metals will appear in due course.

222 A.P.D., Barpeta Road—Process of manufacturing iron bell will appear in due course.

223 M.K., Hubli—Brown coloured outer shells of tamarind seeds are removed by decorticating machines. Now the seeds are ground very fine.

224 M.A.R., Hyderabad—Formulas of pimple removing ointment or lotion will appear in due course.

225 S.S.S.C., Mushkipur—Sewing and crochet thread may be had of Chittaranjan Crochet Cotton Mfg. Co., 37, Ghose Lane, Calcutta and Calcutta Miscellany, 12, Ghose Lane, Calcutta. Agent for Dietz lantern is Volkart Bros., Ballard Estate, Bombay.

226 L.B.L., Kanpur—Wants to be put in touch with the dealers in mantle knitting machines.

228 A.A., Rangpur—For manufacture of candles you require hard paraffine which may be had of Burmah Shell Oil Storage & Distributing Co. Ltd., Hongkong House, Dalhousie Square, Calcutta.

229 R.C., Agra—Process of manufacturing shoe polish and heel valve will appear in due course.

231 T.P., Palakol—Following is a formula of pain balm: Yellow vaseline 10 parts; methyl salicylate 2 parts; oil of cajuput 2 parts; oil of eucalyptus 2 parts; menthol 2 parts; camphor 2 parts. Mix thoroughly in a stone mortar and put in wide mouthed bottles. It may be rubbed gently over the affected parts.

232 J.N.C., Bogra—Add salicylic acid when the syrup is hot; you may also add dye when the syrup is hot. As regards flavour you should add it when the syrup is cold. All the ingredients may be had of Banshidhar Dutt, 126, Khengrapatty Street, Calcutta. You should refer your query to Registration Department of your Government. Old issues of Industry are not available.

233 A.N.S., Imphal—For exchange of currency notes you have to apply to Reserve Bank of India, Dalhousie Square, Calcutta.

236 P.V.R., Eklaspur—Following is a list of gold thread manufacturers: Sitaram Kandas, Rampura Road, Surat; Vaju Bhai Chunilal, Gopipura, Surat; Mysore Gold Thread Co. Ltd., Bangalore City; S. Dhondusa Gold Thread Factory, Subedar Chatram Road, Bangalore and Benares Industries Ltd., Chowk, Benares. It is not possible to start manufacture of gold thread on cottage industry basis.

237 T.S.V., Raipur—No business can be started without any capital. You may however try to take agency of some unrepresented firms.

238 C.B., Makrana—Following is a formula of tailor's chalk: Chalk powder 28 parts; soapstone 18 parts; China clay 10 parts; Yellow ochre 7 parts; Lemon chrome yellow 1½ parts. Make into a paste with water and mould. Following is a formula of chalk crayon: Precipitated chalk 40 parts; Plaster of Paris 45 parts; Lithopone 10 parts; Glue solution 5-10 parts. Knead all together to make a soft dough and pour into gun metal moulds. When set take out and allow to dry in air. Then put all together in a tray and moderately bake over mild fire.

239 S.C.D.P., Saktipur—Following is a list of silk merchants: Gouranga Lal Seth, 201, Harrison Road, Barrabazar; Guru Prosad Shaw, 201, Hrrrison Road and Hardayal Mall Kedarnath Mehra, 28, Cross Street, all of Calcutta. For lotus honey you may enquire of Bhan Brothers Ltd., Srinagar, Kashmir and Kashmir Honey Stores, Udhanpore, Kashmir. Process of manufacturing Chabanaprash will appear in due course.

240 K.B.L., Manmad—Child education is published by Evans Bros. Ltd., Montague House, Russell Square, London W.C.1.; Children's Newspaper is published by Amalgamated Press Ltd., Fleetway House, Farrington Street, London E.C.4 and Time and Tide published by Time and Tide Publishing Co., 32, Bloomsborg Street, London W.C.1.

241 H.R.K., Jullundur City—Process of manufacturing mortar will appear in due course.

243 S.I., Jamnagar—We have no book dealing with the manufacture of synthetic perfumes; A good formula of pain killer appears under No. 23.

244 B.L.P.S., Amadalavalasa—For twine making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

245 P.S., Kapurtrala—Black salt is prepared thus: Common salt is heated with the chebulic and emblic myrobalans together with saji, until a sort of fusion takes place. The article so manufactured is used as a medicine.

246 U.S.P., Rai Bareli—Bone black is also known as animal charcoal which may be had of Calcutta Chemical Co., Ltd., 10, Bonfields Lane, Calcutta.

247 M.N.N., Ahmedabad—A good formula of chalk crayon appears under No. 238. Process of manufacturing slate will appear in due course.

248 M.C.Z., Bombay—Recipes of Sen Sen, etc. will appear in due course.

250 S.M.D., Ambala—Formulas of paper varnish, office paste, etc. will appear in an early issue of Industry.

252 P.M., Bangalore—We are not aware of the Doctor's Association as asked by you.

253 R.S., Tenali—For cantharidine enquire of Ghose Bros., 50, Ezra Street, Calcutta. You may consult Manufacture of Toilet Goods published from this office, price Rs. 4/7- including postage.

254 K.T., Point Pedro—We have no book on weaving.

255 T.V.C., Guntur—It is not possible to extract oil without any machine; you should use ghany driven by electricity or bulls. Candle is manufactured from hard paraffin. Hard paraffin is melted and poured in candle making mould set with wick.

257 M.S., Vizianagram—For pictures and picture frames enquire of A. K. Ghose & Sons, 161, Lower Chitpur Road; Chaitanya Lal De & Co., 165, Lower Chitpur Road and Universal Art Gallery, 1, Cornwallis Street all of Calcutta.

259 A.D.P., Belgaum—For hessian enquire of Calcutta Hessian Exchange, 98-2, Netaji Subhas Road, Calcutta and Jute & Gunny Brokers Ltd., 8, Royal Exchange Place, both of Calcutta.

260 R.S.S., Shikohabad—You have to invest at least Rs. 25,000/- for starting carbon paper manufacture. For pushing sale you have to appoint agents in chief towns of India. A formula of pain balm will be found under No. 231 above.

261 S.M.O., Howrah—You better advertise in newspapers for taking agency of textile and metal goods.

262 J.R.S.P., Calcutta—Following is the process of manufacturing waxed paper: The paper in the form of a continuous sheet is passed through a bath of melted wax at a high temperature, any excess being removed by squeezing rolls through which the hot waxed paper is passed. The paper is led over skeleton drums and thoroughly cooled before being cut into sheets.

263 S.M.O., Howrah—For manufacturing nameplates of sheet metal you have to use press machine which may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta.

265 S.V., Lucknow—You have to use tincture of iodine. It is not possible to remove hair permanently. Collapsible tubes may be had of Metal Box Co. of India Ltd., B2, Hide Road, Kidderpur, Calcutta. Shaving powder is used after shaving. Other preparations you require will be found in Manufacture of Toilet Goods published from this office, price Rs. 4/7- including postage.

266 S.I., Jamnagar—A formula of pain balm will be found under No. 231. We have no book dealing with manufacturing synthetic non-alcoholic perfume compound. Refer your query to the Controller of Paper, Ministry of Industry and Supply, New Delhi.

267 B.R.S.C., Phagwara—Process of manufacturing tin slate will appear in due course.

268 S.A.G., Oddanchattaram—An article on plastic industry appeared in December 1948 issue of Industry. Chemicals and machines may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

272 N.D.P.A., Kanpur—For ice candy making machines enquire of Refrigerators (India) Ltd., 59C, Park Street, Calcutta and M. S. Vernal & Co., Magnate House, Chittaranjan Avenue, Calcutta.

279 P.V.N., Palghat—For Calcutta Guide write to W. Newman & Co. Ltd., 3, Old Court House Street, Calcutta. We have no homeopathic directory.

280 P.C.C., Benares—For pharmaceutical machines enquire of Probartak Commercial Corporation, 61, Bow Bazar Street, Calcutta.

281 K.C.S.R., Guntur—Match chemicals may be had of Allied Agency, 16, Bonfields Lane, Calcutta. Glue may be had of Banshidhar Dutt, 126, Khengrapatty Street, Calcutta. Infusorial earth may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta.

282 D.R.M.L., Kanpur—You may start a hosiery factory with Rs. 40,000. For machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

283 R.B.S., Sitapur—Mustard oil is mainly used for edible purpose. For selling mustard oil you should advertise in newspapers of Calcutta.

285 S.R.D., Trichinopoly—For wood working machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

286 P.C.W., Delhi—An article on plastic industry appeared in December 1948 issue of Industry.

288 B.M.E.W., Chikmagalur—Wind the magneto with copper wire and pass electric current by means of a battery. Detailed process will be found in The Electrician published from this office, price Rs. 6/7- including postage

290 R.L.M., Kangra—It is not possible to manufacture cigarette on small scale. It is rather a big industry which requires investment of some lakhs.

291 P.E.W., New Delhi—We are not aware of any wax prepared from rubber and china clay.

292 S.P.S., Lucknow—Naphthalene powder may be had of H. Momtaz & Co., 1, Colootola Street, Calcutta.

293 M.S.W., Koregaon—Process of manufacturing soap will be found in Manufacture of Soap published from this office, price Rs. 3/7/- including postage. Soap materials may be had of Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta.

296 Q.C.C., Colombo—Hosiery machines may be had of A. N. Sayal & Co., 76, Ramnagar, New Delhi and W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

297 T.S., Parvatipuram—Yarn may be had of E. B. Bros. & Co., 3, David Joseph Lane; Mohini Mohan Banerjee, 19A, Cross Street and Mooljee Girdhardas, 160-176, Cross Street, all of Calcutta. Regarding knitting machine see under No. 296.

298 S.B.M., Bankura—For physical testing, a specific gravity apparatus, a viscometer and a refractometer etc. are used. In addition to these chemical testing of the oil is necessary. The determination of saponification value and iodine value is the most important among the chemical tests.

301 A.D.K.S., Trichur—For the chemicals enquire of Calcutta Chemical Co., Ltd., 10, Bonfield Lane, Calcutta.

305 B.N.A., Hindupur—Tin can making machines may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta. For vacuum packing machines enquire of Oriental Machinery Supplying Agency, P12, Mission Row Extension, Calcutta.

309 M.G.R., Coondapoor—We have no book exclusively dealing with fireworks manufacture. A chapter however appears in Home Industries. You may also consult The Art of Pyrotechny by Kentish.

310 G.R., Tanjore—Stationery goods may be had of Mittra Bros., 23, Canning Street, Nilmoney Halder & Co., 11, Chittaranjan Avenue; P. Sen & Co., 14/2, Old China Bazar Street, all of Calcutta. For books enquire of Gurdas Chatterjee & Sons, 203-1-1, Cornwallis Street and Vishwa Bharati, College Square; both of Calcutta.

311 S. V. S., Gadag—Hydrofluoric acid is used for glass etching or engraving. Hydrofluoric acid may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta. Process of manufacturing rubber stamps will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage.

312 M. C., Kamrup—We are not aware of any laboratory using tea. Following is a list of tea merchants:—A Tosh & Sons, 11/1, Harrison Road; B. K. Saha & Bros. Ltd., 5, Pollock Street and Indo Tea Co., 42, Strand Road; all of Calcutta. You should advertise for selling tea. As regards bank you should approach local banks with your proposal.

313 R. A., Raipur—For machines enquire of Alfred Herbert (India) Ltd., 13/3, Strand Road and Francis Klein & Co. Ltd., 1, Royal Exchange Place; both of Calcutta. Button making machines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

314 R. B. D. G., Alwar—For hemstitching machine enquire of Adler & Mundlos Sewing Machines, 109A, Chittaranjan Avenue; Don Watson & Co. Ltd., 19, British Indian Street and K. C. Mullick & Sons Ltd., 77-13, Dharamtala Street; all of Calcutta. You may start soap manufacture with Rs. 5,000/- to Rs. 10,000/- as capital. It will not be possible to manufacture spectacles frame with Rs. 10,000/-.

Review of Books

CURRENT EVENTS (MONTHLY). PUBLISHED by B. N. Basu Mullick from 2E, Kartick Bose Lane, Calcutta. Pages 15, Annual subscription Re. 1-8 only.

One may easily keep himself abreast of the current political and economic affairs, if he goes through daily newspapers. But it is difficult to keep them in memory in exact sequence. Besides, while we read newspapers we seldom, find time to exercise our discrimination and discretion, and single out the significant events.

But Current Events is a monthly magazine which has beautifully winnowed the significant events from the accumulated heap of news reports. They are particularly useful for those who want to keep the current political and economic affairs at the finger tips. It also serves as a companion volume to ambitious students who desire to compete in the highest administrative services in the State. The magazine, seeks to epitomise worlds' daily affairs, devoting its attention, primarily to Indian affairs, reporting the day's significant affairs, in correct and exact sequence.

We highly commend this journal to, journalists and students.

MODERN COTTAGES. Published by Mani Putthaka Salai, Swamimalai, South India. Pages 79, price Rs. 5.

Housing problem in India is assuming serious proportions. And it is high time that Government should do their best to tackle this problem effectively and scientifically. Congestion in overcrowded cities, like Calcutta, is positively detrimental to the health and sanitation of the people. So one of the primary tasks will be to avoid this congestion further. We have faintly heard of State sponsored scheme of satellite towns. We don't know how far it has progressed.

In the implementation of any such constructive scheme, the role of an architect will be of vital importance. So G. V. S. Mani's book on Modern Cottages from that standpoint serves a very useful purpose. It furnishes us with vivid architectural designs of cottages which very well serve as peaceful suburban retreats of upper middle class and aristocratic classes.

One vital aspect of house building, however, seems to have been lost sight of—the aspect of finance. We admit, it is very difficult to give an exact and accurate estimate. But we can reasosably expect an approximate estimate.

Furthermore, we ask Mr. G. V. S. Mani to see if it is possible to widen scope of the book. The pattern of modern cottages, as conceived by him, suits the middle and aristocratic classes in particular. We hope, Mr. Mani will, in next editions, incorporate, within his book, designs suitable for working-class people in bustee areas. We are aware that bustees in cities are veritable hells, and people there live in unimaginable misery and squalor. Proper housing and accommodation is a problem which brooks no delay but calls for immediate attention and is in the higher national interests of our country. We hope, the problem will receive due attention from Mr. G. V. S. Mani. We commend this book to the interested readers.

GENERAL ECONOMIC HISTORY. Published by Vora & Co., Publishers Ltd., 3-4, Round Building, Bombay 2. Pages 287, price Rs. 5-8.

In order to solve the numerous economic problems that confront us to day, it is essential that we try to gain a correct perspective into the economic history of our own country. It is only when we have fully grasped the different tendencies in the economic life of our own country that we may be able to solve problems effectively and satisfactorily. So study of economic history is not only important but indispensable for the uplift of the country as a whole. From that standpoint general *economic History* by S. B. Mahabal fulfils a very important function. The remarkable feature of this book is that different trends of economic history of our country have been examined and studied in relation to the movements in foreign countries, particularly Great Britain, so as to enable us to make a comparative study of the different economics in India and America. Another attractive feature of this book is that the author has explained this difficult subject in a plain, lucid and intelligible manner. This is a rare equality, and invariably testifies to author's clear thinking and penetrating insight. The chapters to which we particularly draw the attention of the readers are those on "Industrial Revolution in different countries", "features of industrialism" "Revolution in commerce" and "Revolution in transport" and "changes in economic thought and policy". A close perusal of these specific chapters, will, we hope, give a clear and vivid picture of the work of economic forces. We highly commend this book to our readers.

INDIA IN TRANSITION. Published by Dr. M. G. Nene & Dr. S. M. Barde, Barsi, Sholapur. Pages 399, price Rs. 7-8-0.

The book does not merely confine itself to the fateful transitional phase in the history of her struggle for freedom. It embraces the entire range of history beginning from the embryonic phases of political consciousness. The book surely bears the mark of a historian's objectivity and impartiality and has been written in a plain, lucid language, so that it may reach the hearts of the general masses.

Political and social education is the crying need of the hour. Looked from that standpoint nobody can deny the usefulness of such books. Dr. M. G. Nene and Dr. S. M. Barde have endeavoured to drive home the basic fact that initial conflicts as there were between the Hindus and Muslims, unity and amity between

them were quite a feasible proposition unless British machination and diplomacy succeeded in driving a wedge between these major communities and thus completely frustrating all attempts of unification.

The book is up-to-date, containing latest constitutional progress and developments e.g. Arrival of Cabinet Delegation and their statements, on its failure arrival of Mountbatten and his plan to solve the tangle. The book also depicts the terrible bloodshed which has tarnished the fair name of India and which is largely the result of British diplomacy and intrigue and partly the result of undue concessions, granted to the Muslim community in the shape of separate electorate and Communal Award.

The division of India has been the logical and inevitable consequence. But it is no use ruing an accomplished evil. But from now we should try to learn the lessons of history and organise the cementing and cohesive forces that flow as undercurrent throughout the history of India.

MODERN PUBLICITY. Published by the Studio Limited. 66, Chandos Place, London W. C. 2. Pages 136, price 30-Shs.

The scope of modern publicity has largely widened, embracing within its sphere a wide range and variety including travel, cultural and commercial affairs. The pictorial book, under review, demonstrates the various technique of advertising in the different parts of the country and thus affords an opportunity to compare and examine the different forms of publicity.

For the convenience of the readers the book has been divided into sections headed travel, cultural and social, commercial incorporating publicity in its manifold forms.

It is not unoften that advertising is associated with commercialism. And we very often forget that in addition to commercial benefits, accruing out of it, advertising brings us into intimate communion with the different aspects of social cultural, life of the different countries of the world. This book, we believe, will serve this purpose very well.

This book again, we believe, will play no inconsiderable part in raising the standard of advertising in posters and showcards.

The task of the edition has been surely a tremendous one. The book will really prove useful in providing sufficient inspiration and incentive to Indian advertising as well. The art of advertising is at a very low ebb in India. So spread of foreign technique of advertising, should be encouraged by all possible means. Considered from that standpoint, this symposium of publicity may serve as a storehouse of fruitful lessons in advertising. The commercial section, in particular, may be fruitfully utilised to the tangible commercial benefits of India. The section again, is sub-divided into several sub-sections e.g. posters, showcards, catalogues, leaflets, packaging, labels, trade marks.

The book has an alluring and seductive appearance and will stimulate in everyone an interest in its rich contents.

NOTICES & REVIEWS

(Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medical preparations and allied substances in this section.)

NEW YEAR CALENDARS.

We are glad to receive new year calendars from the following:—

Industrial & Variety Stores of Chaibassa, Chaibassa, Singbhum; and Industrial Chemicals (India), Cenral Bank Bldgs., Masjid Bunder Road, Bombay No. 13.

A CITY GUIDE.

We have the pleasure to receive a copy of Trichy-Srirangam City Guide & Directory containing many useful information. It is published by Trichy News & Books Service, Seshapuram, Tiruchirapalli. Price annas four only.

TRADE ENQUIRIES

(To communicate with any party write to him direct with name and address given below mentioning Industry).

80 Loonkaran Shivaprasad, Rajaldesar, Bikaner—Wants to be put in touch with the suppliers of wooden swing containing wooden horses, lions, chairs, etc. as seats.

89 B.N. Shaw & Son, Jamalpur, E. I. Ry.—Want to be put in touch with the dealers in groundnut in Calcutta and Madras.

90 Mahendra Agencies, Mundia-Dhureki, Budaun—Want to be put in touch with the suppliers of lead shots—of 1, 1½ milimeter in diameter.

108 B.N. Mallappa, Santhepet, Mysore—Wants to be put in touch with the suppliers of sunflower seeds.

132 S.R. Bose, 4, B. T. Road, P.O. Baranagore, 24 Parganas, Bengal—Wants a capitalist partner with Rs. 25,000/- to Rs. 30,000/- for starting plastic industry.

205 A. S. Alag, 117, Rajendra Market, Hazari, Delhi—Wants to be put in touch with the suppliers of gum tragacanth and gum acacia.

222 Amulya Prosad Das C/o. Umesh Ch. Das & Sons, Barpeta Road, Assam—Wants to be put in touch with the suppliers of materials suitable for iron bell making.

227 S. Balwinder Singh & Sons, Lakkar Bazar, Ludhiana—Wants to be put in touch with the suppliers of jute grease packing and manufacturers of water meter gears and water meters.

230 S. N. Chatterjee, 30-2, Russa Road, Calcutta 26—Wants to be put in touch with the suppliers of sandal wood plank and camphor wood plank.

276 Overseas Distributing Co., 105-31, Premnagar, Kanpur—Want to be put in touch with the suppliers of dry fruits, herbs and drugs, asafoetida and old newspaper.

303 Anand Book Depot & Printing Press, Hubli—Want a capitalist who can invest in expanding the business.

Edited, Printed & Published by K. N. Banerjee, for Industry Publishers Ltd., at the "*INDUSTRY PRESS*," 22, R. G. Kar Road, Calcutta-4.

FORTIETH YEAR OF PUBLICATION

UNDED BY K.M.BANERJEE

NTHLY MAGAZINE FOR MANUFACTURERS & BUSINESSME

VOL. XL. CALCUTTA, MAY, 1949.

INDUSTRY.

A Monthly Magazine for Manufacturers and Businessmen.

Published in the first week of the month by
INDUSTRY PUBLISHERS LTD.,
22, R. G. Kar Road, Calcutta-4.

EDITORIAL CONTENTS FOR MAY, 1949.

BUSINESS NOTICE.

SUBSCRIPTION DEPARTMENNT.

Annual Subscription, Indian — Rs. 6/-
Foreign — Sh. 12/-
Including postage, but excluding V.P. and Registration charges.
Single Copy (ordinary issue) — As. -/8/-
" " Foreign — Sh. 1/-
" " Special Issue (4 times a year) — As. -/10/-

Subscribers are enlisted at any time of the year for a period of 12 months. Subscribers will receive 12 issues in all beginning with the issue for the month of enlistment. Subscribers are not enlisted for any period less than a year.

Subscription money is always payable in advance or by V.P.P.

ADVERTISEMENT DEPARTMENT.

Last day of accepting advertisement is the 10th day of the previous month. Any order for alteration or correction of copy is not entertained after that day.

Advertisement rates for ordinary and special position, both casual or contractual, are sent on request.

CORRESPONDENCE.

All enquiries regarding industrial or business information should be addressed to the Editor. Contributions and articles for review and notice should also be sent to him.

All enquiries regarding the Subscription or Advertisement Departments should be addressed to the General Manager.

OFFICE HOURS.

Editorial Department — 11 A.M. to 4 P.M. on weekdays and 11 A.M. to 2 P.M. on Saturdays.

Subscription and Advertisement Department 10 A.M. to 5 P.M. on weekdays and 10 A.M. to 2 P.M. on Saturdays.

Classified Bargains

ADVERTISEMENTS under this head of small announcements cost 4 As. per word, minimum Rs. 3 payable by Postage Stamp or M.O. with order. No vouchers given.
To Readers—In writing to advertisers the Readers are requested to write legibly and quote that they are writing in response to advertisement in INDUSTRY. This would ensure prompt attention. Letters to Advt. No. should be duly stamped.

LIST OF CLASSIFICATIONS.

- Agents Wanted
- Agencies Wanted
- Agencies, Foreign
- Bank & Insurance
- Bills, Bonds, Hundies
- Books & Periodicals
- Bottles & Corks
- Brass Component
- Brushes
- Button & Ivory
- Carbon Brushes
- Cardboard Boxes
- Chemicals & Minerals
- Cinema Distributors
- Crude Drugs
- Cycles & Cars
- Cutlery
- Dental & Optical Materials
- Educational & Instructions
- Expert Wanted
- Filter Paper
- Financial
- Floors & Floor Covering
- Gardening & Agriliulture
- Glass & Apparatus
- Jewelleries
- Machinery & Hardware
- Medicines
- Miscellaneous Advtg.
- Paint & Colours
- Patents & Trade Marks
- Perfumery & Toilets
- Personal & Professional
- Photography
- Plywood & Bobbin
- Potteries
- Printing & Stationery
- Radio & Electric Goods
- Rubber Stamps
- Sale & Purchase
- Situasion Wanted
- Situation Vacant
- Small Tools
- Sports, Music & Arts
- Springs
- Stamps & Coins
- Stock & Share
- Surgical Instruments
- Talkie Machineries
- Tea & Confeltions
- Textile Materials
- Wearing Apparels

AGENTS WANTED

For "Organisers and Agents" on suitable terms, apply Oriental Provident Insurance Ltd. 23, Canning Street, Calcutta. Phone Cal. 7175. 173 AA

Wanted Agents to Earn 500/- Monthly working for Embossers, Nameplates, Locks & Pinning machines. Apply Azad Company (Regd.), Aligarh. 94 AA

"Wanted Agents, Wholesalers, Stockists to push "Bosco's" perfumery products." Apply Bosco Chemical Works, 18/1, Sahitya Parishad Street, Calcutta—6. 257 AA

"Wanted canvassing agents and customers on commission basis for Bhavani Carpets and handbags Apply "Jupiter Carpet Works, Bhavani, South India". 54 AA

Wanted Merchants & Agents for Toilet-goods, Bengal Hair oil, Hill snow, Pomade etc., in India & Colonies R. K. Mehrotra & Sons, Cawnpore. 362 AA

Wanted Agents & Stockists for 'Corn-kil,' remedy for Corns Modern Pharmaceutiical Laboratory, 121-A, Bowbazar Street, Calcutta. 3 AA

Wanted stockists throughout Indian-union to sell Candles, Ratescheap Lokenath Industries, 18, Ramlal Bose Lane, Radhanagar, Burdwan. 593 AA

Wanted Agents, Earn Rs. 15/- or more daily, For Particulars and agencyterms contact K. N Kumar & Bros, 6/1, Gurdwara Road, Karol Bagh, Delhi. 596 AA

Wanted canvassing Travelling commission agents to book orders for our silk, cotton, border and ordinary, twiseed carpets, hand bags etc., on Commission basis. For full Details apply sharp to B. N. Guru Swamy Gounder & Bros., Carpet Manufacturers, Bhavani (via) Erode, (S.I.). 565 AA

AGENTS WANTED.

Sweet Chewing Cigarettes, Eucalyptus Oil, Honey, Scented Supari Etc., PPCo., 43, Varadamuthiappan St. Madras. 273 AA

Wanted Agents for all kinds of Buttons and Tailoring Materials, Industrial Distributors D-5/89 Tibbia College, New Delhi 482 AA

Buckinghum Color Co. Indore, Want Agents for Paints, Dry colours, Varnish paints white paints apply 548 AA

Agents distributors required for radios in all towns Apply Advr No 540, C/o. Industry, Calcutta. 540 AA

Wanted Agents pay Rs. 200 allowance daily Rs 5 and on commission for foreign goods, Lalit Import Service, Sadarbazar, Delhi. 496 AA

Wanted District Agents in every District for Genuine English Relief Nibs 314. Apply Eastern Import Agency, Post Box 176, Delhi. 7 AA

For Agency of Pure Silk Handkerchieves. Sample will be sent by V P P of Rs 7/8/- on request. Kantilal Hirachand Shah, 2990, Ratan Pole, Ahmedabad. 542 AA

Wanted:—Agents and Stockists for our High class Horn and Pearl Buttons J Smith & Co., 186-5, *Gopal Lal Thakur Road, Baranagar*, Calcutta. 132 AA

Wanted Commission Agents, Seep Ivory Coat, Pant, Buttons Samples Rs 5/- Bhagwan Store, Chandi Market, Saddar Bazar, Delhi. 237 AA

Wanted Canvassing Agents & Customers for our Silk & Cloth Carpets & handbags—very liberal terms—Apply to Parasakthi & Co., Carpet manufacturers. Bhavani (Via) Erode, S. I. Ry. 411 AA

Wanted Stockists, Agents for Blood Bank (Nervine Tonic) & other Patent Medicines, Syrups, Extracts and Injectables, Elixir Drug Company, Ltd., 45, Bowbazar Street, Calcutta. 263 AA

Wanted Agents in each city to sell our washing soaps, terms very liberal, apply to the managing director, Saraswati Vegetable Oil Mills Ltd., 428, Kalbadevi Road, Bombay. 146 AA

Lily Tobacco Products, 43, Indrani Park, Tollygunge, Calcutta. Manufacturers of: Famous "Lily Kimam," Mohini Zarda, Kesarbilas, Elachidana, varieties of leaf zarda, other betel-spices & perfumes. Wanted Stockists & Agents. 265 AA

Wanted District & Travelling agents for Fountain pens, Silk Handkerchives, Cutlery & fancy goods on attractive terms D. R. Puri & Son, 6/30, Western Extention, Karol Bagh, New Delhi 89 AA

Sealing Pliers. For sealing articles with lead seals, well-made and nicklled. Price Rs. 10/- only, plus postage The International Lock Factory, 12, Kalia Street, Aligarh. U P. Wanted Agents 339 AA

Wanted agents & stokists for sale of chaff cutter knives & Machines, Spades, Oil expeller parts, Iron presses (Istries), Vermillion machines, Steel wire springs etc, Standard Iron & Steel Works, Phagwara. (E. P. Ry.). 564 AA

AGENTS WANTED.

Salary Rs. 75/- plus commission to suitable representatives. Apply Valley Tea Corporation, 37, Durga Charan Doctor Road, Calcutta 14 37 AA

Latest Plastic Bangles & Plasticware: Wanted, agents, distributors, wholesale buyers and stockists everywhere, contact, Geria & Sons, 5-1/36, Sindhi Lane, Bombay 4. 568 AA

Wanted genuine agents for hair disease specific Kunch Oil with Ivory dust Sample Rs. 2/-. Kalna Chemical, Kalna. W. Bengal. 580 AA

Wanted agents & purchasers for our High class superior Madras Snuff, Perfumed and non-perfumed. **Highly pungent.** Visweswar Snuff Works (Regd.) Ellore, W. G. (S I.) 581 AA

Wanted agents for Shavery nongrowth hair German remedy Retail Rs 10/- each, wholesale less 15 per cent. Full Payment in advance, Stockist Navjiwan Aushadhalaya. Kalupur. Doshiwada Street. Ahmedabad. 563 AA

Wanted travelling-agents & stockists every-where on commision for our Scissors & Razors (India Burma, Ceylone, Africa. Afghanistan & Malaya), Gupta Trading Co, Kanongoyan Street, Meerut. 479 AA

Wanted stockists & Agents throughout India, **Pakistan & abroad** for M.O.P., Nut and Horn Buttons Apply to the Star Button Factory, 62, Pathuriaghata Street. Calcutta 6 573 AA

Wanted:—Wholesale Dealers for our own make first class "Mullick" Brand Rotary Treadle Sewing Mechinees. Thousands are already in actual use with reputation K. C. Mullick & Sons, Ltd., 77-13, Dharamtalla St., Calcutta. 168 AA

Applications invited from respectable busi-nessmen experienced in sales and organisation, for take charge of our new depots to be opened in all districts of Behar, and to work as distributors for the respective District Company will bear expenses of establishment of the depot A fixed allowance and decent commission will be offered Chief Organiger, Rowmee Oil Mills Co., 12, Pollock Street, Calcutta. 585 AA

AGENCIES WANTED

Agencies Wanted for Chemicals, Minerals, Paints. Glass and all varieties of Raw and finished products. Dawn & Co., 11. Portuguese Church Street, Calcutta. (Estd. 1906). 61 AG

A limited Co. is willing to work as sole agent/stockist of Indian Products Manufacturers are requested to contact with terms to: S. B S. (India) Ltd. 57, Netaji Subhas Road, (Rajakatra, Room No. 14), Calcueta. 300 AG

A Public limited Company with wide Sales organisation and own Shop establishments throughout Bengal. Bihar, and Orissa desires to represent Manufacturers on suitable terms. Post Box G.P.O. 2291, Calcutta. 550 AG

Agencies wanted, from manufacturers and firms, which are dealing in all types of machinery, proprietary articals and in Hardware. Please contact Messrs International Commercial Corp., Agency Dept., Dhamangaon R S. 462 AG

BOTTLES & CORKS

We manufacture moulds for glass wares e.g. files bottles, etc. A. M. Banerjee, 34, Ezra St., Calcutta. 513 BC

For all sorts of bottles phials & corks Imperial Glass Works Agents: Ananta Kumar Ghosh & Co., 9, Ezra Street, Calcutta. Phone:— B. B. 5740. 210 BC

BOTTLES & CORKS.

San-Tesh & Co., 12, David Joseph Lane, Calcutta—1, Coloured & White Bottles, Phials, Cork Products, Cellulose Capsules, Bakelite, Metal & Aluminium Caps, Sandal Oil & Essential Oils etc. Phone: West 1091. Telegram: 'Santexko'. 312 BC

Nath & Bros., 67, Ezra Street, Calcutta. Dealers in empty Bottles, Phials, Corks. 70 BC

Shree Gopal Bottle Agency, 27, Pollock St., Calcutta: Stockists & dealers of all kinds of glass-bottles & phials, etc. 121 BC

Ashini Kumar Dass & Co., 180, Lower Chitpore Road, Calcutta. Importers of Bottles phials corks, capsules etc. 197 BC

Krishna Silicate & Glass Works, Ltd., 17, Radhabazar Street. Calcutta Manufacturers of Bottles & Phials of every description. 68 BC

Radha Bazar Bottles Stores, 15, Radha Ba-zar Lane. Calcutta 1 Bottles Phials. Cork Products, etc. Phone: Cal. 6794. Tele: "Korkbag" 69 BC

Bimal Bottle Stores, 130, Radhabazar Street, Calcutta Dealers & Importers of empty Bottles, Phials, Homoeo **Phials, Glasswares & Corks, of all descriptions** 140 BC

BRASS COMPONENT

Brass, Castings, Washers, Machine Screws, Buckles. etc. made to specification. Enquire Stores Supply Syndicate, 20, Strand Rd., Calcutta. 72 BS

BUTTON & IVORY

Wanted agents for big business centres in India & Pakistan on guranteed commission of Rs 125, 250 and 500 monthly. Samples Rs. 3 Write to Jahangirnagar Button Manufacturing Co., Postha, Dacca. 549 BI

BOOKS & PERIODICALS

Latest Useful Books. List free. N. K. Paul & Sons, P.B. No. 12202, Calcutta. 120 BK

Profitable & Useful Books. List Free. Bharat Trades, P.B. No. 67, Agra. 315 BK

Indian Hosiery Journal, Hosiery & Textile review. Monthly Specimen Annas Seven, Journals Publication, Ludhiana. 490 BK

Wanted second hand Thacker's Indian Directory. Quote lowest price to Saksena Perfumery Works, Kanauj. U P. 579 BK

'520 Money-making Opportunities' Price Rs. 2/- post free. Saraswati Printing Works, Ajmer. 577 BK

CARDBOARD BOXES

Bengal Cardboard Industries & Printers Ltd., 165, Cornwallis Street, Calcutta 6. Manufacturers of Cartons, Rigid & Collapsible Cardboard Boxes, Display Containers, Cut-outs etc. (Printed or Plain). **Stockists of Boards and Papers of all kinds.** 91 CB

For cartoons & other kinds of Card Board Boxes, please enquire:—Mullick & Co. 82, Harrison Road, Calcutta. 123 CB

CARBON BRUSHES

The Calcutta Carbon-Brush Manufacturing Co., Post Box No. 2495, Calcutta. Importers and manufacturers of Carbon-Brushes. Telegram:—Calcarb. 309 CR

CHEMICALS & MINERALS

India Chemico Mineral Industries, 14-2, Old Chinabazar Street, Calcutta. Chemicals and Minerals Stockists. 57 CM

R. C. Chemical Works, 150/1B, Amherst Street, Calcutta, Factory — 128/1, Bowbazar Street, Calcutta. Manufacturers of: Phenyle, Soft soap, Monopoly soap, Liquid soap & Carbolic Liquid Soap. Wanted Stockists & Agents 591 CM

CRUDE DRUGS

Contact for Herbs, Roots & Drugs To M. K. Namboodiri, Kizhakkumpattukara, Trichur. 147 CD

Madhusudan Chatterjee, 19, Mullick Street, Calcutta, Hingul (Mercury Sulphur Compound) Murdasankha, Red lead, Mercury, Belledona, Liquorious Root, Raowolfia Serpentina, Senega, Cinchona, Spices, etc. 103 CD

Crude Drugs Senega, Squills, Punarnava, Sarasaparilla, Stramonium, Brahmi leaves, Vasakaleaves, Cassiafistula, Senna, Caltrops, Aloes, Colocynth and Euphorbia., Ayurvedic, Allopathic and Homeopathic Drugs. Trial Solicted. Indian Drugs stores, Grams: "Drugs" Tuticorin. 534 CD

EDUCATIONAL & INSTRUCTIONS

Any degree of Homoeopathic, Ayurvedic etc., write for prospectus Regal College of Physicians, 39, Neogipukur Lane, Calcutta. 323 ED

Government Registered Colleges highest diplomas in Homeopathy & Biochemistry in easiest terms. Prospectus free from International Institute (Regd.), Aligarh. 55 ED

Learn Homoeopathy in Hindi within 6 months through 30 lectures. Homoeopthic Shiksha Mandir, 33/1, Sri Bijeynagar, (Bikaner). 438 ED

Get Indian & Foreign University Matric and higher Degrees by post. Apply, B. E. S, Tollygong, Calcutta. 576 ED

Earn Degrees in every profession, Trade, Arts, Science, Commerce in absentice. prospectus:—(Dept. 16) V. University, Amritsar. 229 ED

Soap, Perfumery, Etc., taught by post. Apply for prospectus with As. 3-4 postage. R. Ghose, B.A., Soap & Perfumery expert, Gold Medalist, (12 years' factory experience), 8, Kripanath Lane, Calcutta. 543 ED

FINANCIAL

Loans arranged on very easy terms. Apply stating your requirements in English to Mr. G. S. Monga, Post Box No. 119, Baroda. 40 FL

Financier Wantetd to invest Rs. 5,000/- to promote a profitable industry. Consult Gopal Chandra Pattanayak, Gopal Ballav Road, Puri, (Orissa). 453 FL

GLASS & APPARATUS

Scientific Glass Apparatus Co., 5A, Prosono Kumar Tagore Street, Calcutta :—Manufacturers of Ampoules, Test tubes, Hydrometers, Glass Apparatus of all description for Hospitals Colleges & Laboratories. 71 GL

Medica Chemical Laboratory, 8A, Raja Nabo Kissen Street, Calcutta. Manufacturers of test tubes, glass syringes, ampoules, lactometers, etc. 97 GL

JEWELLERIES

Jewellers Piercing Saws & Wood fret saws, Best Swiss or German make Rs. 10/- per gross. Jewellers needlefiles original indent lots at 5 per cent. profit on landed cost. Venkatachala Co., Cocanada. 558 JL

MACHINERY & HARDWARE

Genuine Typewriter parts, springs, and accessories. Consult R. B. Typewriter Co., 12B, Clive Row, Calcutta—7. 175 MA

For Tannery Machines, Shaving Staking, Boarding, Buffing, and drum. Write to A. M. Banerjee, 34, Ezra St., Calcutta. 518 MA

Von Trading Co., 8, Clive Row, Calcutta. Dealers, stockists for both new & 2nd Hand Engine, Boilers and other machineries. 169 MA

Belgachia Engineering Works, 30, Belgachia Road, Calcutta. Manufacturers of all sorts of Biscuit, Lozenge, Barley, Soap, Candle Machines dies and other Industrial machineries. 365 MA

Immediate Sale: 30" Peeling Lathe, Double Dimension Saws, Press, Glue-mixing, Chopping Machinery for plywood. Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta 1. 166 MA

Cigarette manufacturing plants and machinery (foreign make) for sale. Please write for particulars and terms: Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta 4. Phone B.B. 3858. 63 MA

Diamond Metal Products Co., 22, Raja Woodmunt Street, Calcutta—1. Stockist of Engineering hand-tools, Carpentary, Tea Garden implements and up-to-date design Brass door and window and furniture fittings etc. 306 MA

We Manufacture Machines for Soap, Lozenges, Biscuit, Chocolate, tablet making, Pharmaceuticals, Paint and Paste, Grinding, Mixing, Chalk stick mould etc. Small Machineries Mfg. Co., 22, R. G. Kar Road, Shambazar, Calcutta—4. Phone: B.B. 3858. 63 MA

Ranjit Engineering Works, Sales Office:— 20, Chitpur Bridge Approach, Calcutta 3. Workshop:—16, Gopal Chandra Bose Lane, Cossipore, Calcutta 2. Manufacturers of:—Machinery for making Soap, Lozenge, Biscuit and Toffee etc., Printing Implements, Book binding, Sugar cane crushing machines and others Industrial Machinery etc. 597 MA

MEDICINES

Rs. 1-4-0 Noted Kosturi, Wonderful Heal Rs. 1-4-0 Kaviraj, 1, Bhim Ghose Bye-Lane, Calcutta—6. 94 MD

Wanted Agents for famous 'Krishna Balm', Sold allover since 30 years. Terms free. Krishna Co., Shivpuri, C.I. 293 MD

Cobra Cane for T. B. All Forms. Literature on application, Acme Trading, 583-7, Yasdan Building, Ratan Talao, Gowali Lane 3, Karachi —1. 107 MD

Piles Cured without operation even of condition worse use our "Arsh Han" oil infalliable, relief immediate price Rs. 3/4/- including postage, P. D. Trading Company, 12, Barehseni Bazar, Aligarh U.P. 544 MD

Tiger Fat for Rheumatism, Gout, Pain Paralysis, Re. 1-2 per tola. Lotus Honey—for eye troubles Re. 1-8 per dram. Sil & Co., 344C, Upper Chitpur Road, Beadon St., P.O. Calcutta. 47 MD

MISCELLANEOUS ADVTG.

Cash Your Spare Hours Without Investment, through interesting plans: Suntex Company, Delhi. 496 AD

Rs. 1,000/- Insurance Policy on your life or Rs. 500 cash: Lottery Ticket: Medicine or advice to cure your disease: Training to make additional income in spare hours. According to rules all Free to Members. Membership Fee Re. 10, Wanted agents. Fortune House P.O. Kashipur Dist. Nainital. 517 AD

MISCELLANEOUS ADVTG.

High quality Swiss cut synthetic ring stones and watchmaterial at cheapest rates. Amalgamated Traders, Cocanada. 558 AD

We supply machinery for chalks, candles, soaps, sealingwax, envelopes & lozenges. Cottage Industries, Lawrence Road, Amritsar. 230 AD

Rs. 150/- Monthly, earn regularly, anywhere, prospects unlimited; correspond Advt. No. 561, C/o. Industry, Calcutta. 561 AD

Earn Rs. 17,476. Apply for our free scheme along with a stamped self-addressed envelope. The "Self Help" Money Circulation Society; Post Box No. 71; Agra. 335 AD

Contact West Punjab Traders Corpn. Asansol (E I R). Pioneer Manufacturers representative & wholesale suppliers of office & school stationery. 19 AD

Start a Home Business. Make something unusual and very profitable. Experience not essential. Details free. Household Industries, Post Box No. 34, Amritsar 1. 588 AD

Free. Gold Talisman. Cure—any disease and fulfil all disires. Write to—Shakti Bhander, P.O. Agartola. (Swadhin Tripura). 582 AD

Do you feel handicapped with your Glasses? You can discard them for better vision by special Visual Training Sight Saving Service, 134-2, Cornwallis St, Calcutta 4. 584 AD

My Hand Press—A duplicator. Reproduces 50—100 copies Most economical. 16 × 10—Rs. 26 10 × 8—Rs. 19 8 × 5—Rs. 12. Universal Traders' Corporation, Ikbal ganj, Ludhiana. 566 AD

Manufacturers & whole-sale dealers may kindly note cheapest & best packing gives full margin to compete in the market Packing cases of any size made from light and strong wood like Shemal can be made to order and furniture etc., can supply from Haldwani. O.T.Rly Station, B. B. Pande, Cambridge House, H.O. Nainital. 545 AD

PATENTS & TRADE MARKS

Dutt & Co., Patent, Design & Trade Mark Agents Prompt and efficient services guaranteed, 82, Harrison Road, Calcutta. 122 PT

For Registration of Patent, Trade Mark & Designs, Calcutta Registration Agency, 39, Neogipukur Lane, Calcutta 14. 324 PT

PAINT & COLOUR

We manufacture Lemon Middle & Orange Chrome pigments. Enquiries solicited. Radiant Paint Works Agents, S K. Sen & Co., 7, Swallow Lane, Calcutta 1. 504 PC

PERSONAL & PROFESSIONAL

Enquiry invited by H. S. Das, A.M.I.S.E. 104/1. Serpentine Lane, Calcutta—14, Cable "Britti rupa" for Acids Nitric, Hydrochloric (all grades) Sulphuric by Contact Process. Rate very attractive. 35 PP

We manufacture Slates, Spt. Levels and Masson Squares. Furniture and Door Locks. Screwdrivers, Bib cocks, Machine Tools and Cast Iron Goods, etc Trade enquires solicited. United Producers Ltd., 14/2, Old China Bazar Street, Calcutta. 350 PP

Pharmaceutical Concern & Druggists willing to get products of their own formula or any standard preparation manufactured under scientific *supervision* in bulk for selling on their own Trade mark may contact with M/s. Adcoo Ltd., Calcutta 27. All types of secrecy assured. 366 PP

PERSONAL & PROFESSIONAL.

Received fresh Stock of Whitex Nail Polish & Remover in Assorted colours. Correspond Sphinx Products, 278-D, Thakurdwar Road, Bombay-2." 515 PP

May Supply, Genuine Musk (Kastoori), Saffron, Pure Shalajit, Honey 1 lb. Jars with attractive labels, in 4, 8 & 18 lbs. Tins. B. P. Standard crude drugs, 20 popular & Efficacious Medicinal preparations, perfumed and Medicated Hair Oils. **Wanted Stockist and Agents.** Grenhills Products Ltd., Rampur State. 547 PP

PERFUMERY & TOILETS

Chandralekha Agarbattis. Wanted Stockists in every town. Contact: Mysore supplies, Mysore. 241 PA

Perfumery Products. Quality guaranteed. A trial will convince you. Jagdish & Bros, Kanauj, U.P. 579 PA

For Indian Atters, and foreign scents, Scented waters etc. The cheapest and most reliable House. Try Saksena Perfumery Works, Kanauj, U.P. 579 PA

Satarupa—A natural Silk & Woollens Cleanser. Free from Caustic Soda or any Acid. For Trade Terms, write to Factory Address: P.O. Uluberia, Howrah. Satarupa Research & Chemical Works, Calcutta. 574 PA

PLYWOOD & BOBBIN

For Sale! Competative Price! All sizes new plywood tea chests, fittings, battens, rivet nails, aluminium lead paper linings. Second hand rebuilted chests also available. R. Ponnuswashy Naidu, Edayar Street, Coimbatore. 450 PW

PRINTING & STATIONERY

We undertake all sorts of Binding work specially in Books, Magazines, Leadger, etc. at a very competative price. We also deals in Binding Materials, Stationery & office equipments. Banerjee Bros. (Book Binders), 22, R. G. Kar Road, Calcutta 4. 214 PS

RADIO & ELECTRIC GOODS

For your Electrical goods & Accessories, Come and do consult with Calcutta Electric Construction, 104/1, Cornwallis St., Calcutta 4. 119 RE

SALE & PURCHASE

Wanted all products for export to America. Can supply requirements from United Kingdom, America and Sweden. M. N. Ray, 27, Kumarmahal, Parel, Bombay 12. 575 SP

25 Best Tested Plans to make money in spare hours with or without investment Rs. 2-12. Money back guaranteed, Write to-day. J. B. Trading Co., Dariba, Delhi. 243 SP

Over 2,000 genuine and up-to-date addresses each of chemists, hardware merchants, kiriana merchants, provision and general stores, etc., etc.; are available for Rs. 20 per thousand. Enquiries regarding every type of Indian and foreign addresses invited. T. C. Khungar & Co., Sushil Bhawan, 4, Daryaganj, Delhi. 248 SP

SPRINGS

Sheffield Spring & Steel Co., 1[illegible], Canning Street, Calcutta. Springs of all kinds and Machines parts. Phone: Cal. 64, Telegrams. "Shessko". 174 SR

TEA & CONFECTIONS

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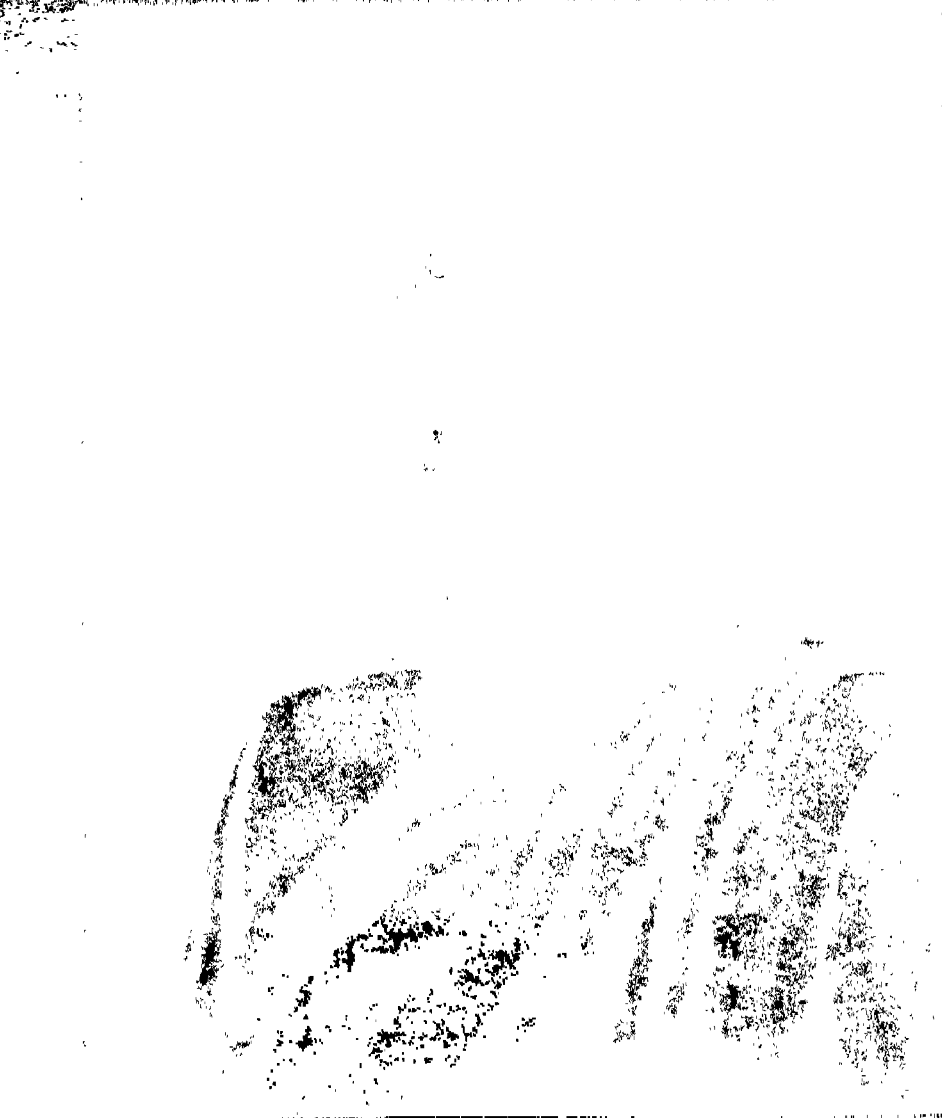
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CHAIRMAN OF THE BOARD OF DIRECTORS, INDUSTRY PUBLISHERS LTD.
Died on 23rd April, 1949 at the age of 61 years.

Industry

EDITOR:
K. N. BANERJEE.

VOL. XL. CALCUTTA, MAY, 1949. No. 470

Sri M. M. BANERJEE PASSES AWAY

We are distinctly poorer to-day by the death of our Sri M. M. Banerjee, Chairman of the Board of Directors, Industry Publishers Ltd. The void created by his demise is hard to be filled up.

Sri Banerjee had been ailing for the last few months but we did not think that he would leave us so soon. His death on April 23, 1949 at his office residence 22, R. G. Kar Road comes as a severe shock to us.

Sri Banerjee was a man of considerable parts. He brought his unequalled knowledge in printing techniques into bearing to better the standard of Industry publications. The position which Industry now holds as a pioneer industrial magazine is much due to his zeal for work and ingenuity.

Sri Banerjee was possessed of a natural gift of strong mechanical sense. His understanding of machines was quick and penetrating. He has helped many with novel designs of machinery construction and his views on intricate mechanical problems were often sought for and regarded with respects even by mechanical engineers and engineering firms like The Heroes Engineering Works Ltd., and The Small Machinery Manufacturing Co. His contribution towards the building of industrial machinery industry in India must be regarded as considerable.

His unassuming manners and wide knowledge of men and things endeared him to the large circle of his friends and admirers.

In this hour of grief our only solace lies in the numberless expressions of sympathy in our sorrow from all parts of the country.

May his soul rest in peace !

CRISIS IN JUTE INDUSTRY

CRISIS in jute industry is gradually deepening. We are aware that this industry draws its main sustenance from raw jute supplies in Pakistan. But the rising cost of Pakistan-jute due to imposition of a heavy export duty, is a source of grave embarassment to the industry and has led to complications and maladjustments which constitute a threat to its shaky existence.

This rising cost and the slow flow of raw jute supplies have been affecting India in three ways. Firstly it has placed her jute industry in a very precarious position. Secondly it is seriously affecting the export trade in India, reducing thereby her Dollar Earning capacity. Thirdly it is creating barriers in the way of reciprocation with other countries in respect of her vital requirements.

In view of the grave economic significance of raw jute, it is imperative that the total output of raw jute production in India should be increased by all conceivable means. And judging from the potentialities of Indian soil, it seems that increase of jute production in India is quite a feasible proposition. But before any plan for increased production may be undertaken, it will have to be first of all ascertained what production target should we fix up. If the Indian Dominion has to maintain her prewar position in the world raw jute trade, this country must produce nearly 75 lakhs bales per annum excluding about 20 lakhs bales of superior quality jute imported from Pakistan. Slight progress has, however, been achieved in this direction, but it falls far short of the aforesaid target of 75 lakhs bales.

To reach this target, all possible resources and ways should be tapped and exploited. And we believe, four ways may be effectively undertaken (i) increasing the yield per acre by use of seeds of improved strains, (ii) application of correct fertilisers, (iii) increase of acreage and (iv) intensive research. Use of improved strains may raise the average yield by 20 per cent. If fertilisers are used in correct proportions, a further increase of 20 per cent can be expected. As regards the third way, it is possible to bring in nearly 500,000 to 600,000 acres under jute without any detriment to rice production.

Sowing has already commenced and it is high time that we carry on extensive propaganda in favour of increased jute production to avert this chronic deficiency.

But however intensive may be our endeavour, the large deficit of raw jute cannot be bridged up overnight. So a mutual understanding between Pakistan and Indian Dominion will be indispensable to satisfy our immediate requirements.

This problem does not brook further delay, but should be settled amicably on Inter-Dominion level.

Current Topics

TWO SCHEMES OF INDIAN FINANCE COMMITTEE

Two Schemes of interest to the engineer and to the common man alike in this country which have received the approval of the Standing Finance Committee recently, are those for the manufacture of heavy electrical equipment and for the construction of prefabricated houses in India. As a result of approval of the first scheme, the first factory for heavy electrical equipment will go into full production in about five years' time. For the implementation of the nation's extensive power development schemes, both hydro-electric and thermal, it has now been computed that machinery capable of producing 1.5 million killowatts between the year 1951 and 1955 (or 300,000 k.w. per annum) and costing Rs. 50 crores will be required. The present project will, therefore, be highly useful in that it will help to fill the gap and co-ordinate the work of development of hydro-electric schemes.

As regards the other scheme, the first factory for the manufacture of pre-fabricated houses, production will begin in the second half of this year. The firm with which the Government of India have entered into agreement in this regard, will render all possible technical assistance for the establishment of the factory and will receive a royalty for the use of patents. The production target will be 100 houses per week. In the initial stages only one type of house is to be produced, such covering an area of 500 sq. feet costing Rs. 25,00.

Both these schemes will evoke keen interest and enthusiasm, because both the problems, which the schemes, have taken into consideration, account for the sufferings and misery of millions of our countrymen.

PROBLEMS OF INDIAN TEA TRADE

The latest developments in the Indian Tea Trade undoubtedly show that Indian interests refuse to be side-tracked, and ignored any longer. They exhibit an assertive tendency and are in fact determined to play a dominant role in the International Tea Trade. The Presidential address, delivered by Mr. D. Keshowajee, at the annual meeting of the Calcutta Tea Merchants Association reflects this tendency clearly.

The development of a world's market at Calcutta, appears to be, according to the President of the Calcutta Tea Merchants' Association, the foremost problem to-day. Objections have been raised from time to time against making Calcutta a world tea marketing centre on untenable grounds e.g. inadequacy of ware-housing facilities. Besides, arguments have been advanced to this effect that conversion of Calcutta into a world centre will bring a conflict with the interests of Colombo and Cochin. But these are all filmsy grounds. In fact, Calcutta may be developed into an international market with the active co-operation of Pakistan and Ceylon and such a move will never clash with their interests. So the reasons cited against such move is extremely unconvincing and untenable. On the other hand strongs reasons may be put forward in its favour in as much as Calcutta market, being the natural source of supply, would easily serve countries like Russia, Austria and the Middle East. Besides, considering the difficulties of shipping, freight, insurance of London, Cal-

utta appear to be a more convenient and otential international market.

Though the factors seem so favour- ble, the real situation leaves no room for elf-complacency. There are reasons to elieve that the quality of Indian tea has eteriorated. Complaints have been re- eived by the Government of India garding the continued poor quality of idian tea. The Government accord- gly have asked the tea producers and tea erchants to see that their production mpares favourably with the produce of her countries. Mr. Keshowjee, also in s address, have stressed their need for roduction and sale of quality-tea in orld markets. The quality problem sumes a special significance at the pre- nt juncture now that the Government of dia has arranged a deal with U.S.S.R. r the supply of 10,000 tons of tea in ex- ange for 100,000 tons wheat.

The President referred to difficulties inland transport and made an appeal the Railway authority for a separate location.

He, then, referred to the high cost of e packing material due to imposition of per cent. revenue duty on imported ests. He therefore appealed to the dian Plywood Industry to realise its mense possibilities and to improve e quality and standard of its oducts so as to suit our requirements.

OBLEMS BEFORE THE PLYWOOD INDUSTRY

From a recent communication address- to the Government of India, by the uth Indian Manufacturers' Association, appears that there is no reason why e should spend our foreign exchange re- urces on imports of plywood products o this country, while the domestic fac- ies can in a substantial way meet our n requirements.

The tea industry in India, is the major consumer of the products of Indian ply- wood industry, in the shape of tea-chests. Requirements of tea gardens are estimated at 100 million sq. feet. And while total capacity of plywood industry in India, is estimated at 70 million sq. feet, Indian production is, at present, approximately one-half of the total requirements.

The main grievance of the industry is that the Government have unnecessarily liberalised the imports of plywood, and thereby considerably undermined the position of indigenous industry. The South Indian Manufacturers' Association are of opinion that further imports are unnecessary and inadvisable, imports allowed in 1948, being sufficiently large to meet the current year's requirements of tea gardens. The Association suggest that imports of additional tea-chests, should no longer be allowed.

But before that claims of the Associa- tion for total cessation of imports may be conceded, it will have to be examined whether the quality of Indian tea-chests comes up to a certain standard. The Asso- ciation, itself come forward and offer sug- gestions which deserve the attention of the Government of India. Firstly they suggest that an Inspectorate should be set up for examination of Indian-made tea-chests. Secondly they suggest that a Marketing Board should be established to affix some quality mark and thereby guarantee its quality to the consumers.

A NEW CHAPTER IN INDO-PAKISTAN TRADE

Trade prospects between India and Pakistan are gradually brightening up. And it is hoped, this friendly commercial intercourse will put an end to all wasteful and undesirable conflicts between the two dominions and usher in a new era of peace and prosperity.

Considered from this standpoint, India Government's decision to allow free export of mustard oil and certain other commodities to East Bengal is highly significant and may be regarded as a great gesture and a practical move towards establishing permanent peace and cordiality in future Indo-Pakistan relations. This concession is, in the first instance, experimental and will last for one month only. The India Government are proceeding with great caution and vigilance and are taking all possible precautions against speculators getting into the trade and indulging in illegal practices. After the expiry of a month, if it be found that the total quantity of export falls below the agreed amount in the Karachi agreement, the Government have agreed to extend suitably the period of free exports in order to permit the balance to be exported.

In regard to matches and hurricane lamps, also, both of which have an exportable surplus in the country, a similar policy has been adopted. These two items, however, will be permitted to be exported freely for a period of three months at the end of which the position will be reviewed and further free exports will be allowed if the Government are satisfied that they have an exportable surplus.

In addition to all these, 18 more items have been included in the free export list. They are salt, silk and art silk manufactures (other than yarn), woollen manufacture, (other than yarn), aluminium ware, sewing machines, brass utensils, art brasswares, torch cells and cans, pressure lamps, soaps, machine tools, etc.

A direct incentive has thus been given to export trade to Pakistan. Pakistan, on her part, should reciprocate and allow an easy export of cotton and jute which has been causing considerable headache to the importers here.

It is highly desirable that both India and Pakistan shall explore all possible ways of co-operation in the field of trade and commerce.

FOREIGN TRADE OF INDIA

In a remarkably lucid address Mr. K. C. Neogi, The Commerce Minister explained the real position of India's foreign trade indicating how the gap between exports and import had widened to the disadvantage of the country.

Larger imports, lower export capacity was the disquieting feature of India's foreign trade.

Mr. Neogi's speech is largely based on figures of foreign trade from April to November, 1948 but the figures for the last month of the year only serve to confirm his findings. The chief problems of India's foreign trade is easily indicated. Imports into this country are running at an annual rate of about Rs. 474 crores which is about 270 per cent. of the pre-war (1937-38) level. Exports on the other hand, are running at an annual rate of 416 crores or only 230 p.c. of the pre-war level. This, in itself, suggests an overall deficit in trade to the tune of Rs. 55 crores. The deficit is shared by all the three types of countries, hard currency, medium currency and soft currency.

India's imports from the U.S. are running at an annual rate of about Rs. 103 crores. But India's exports are only at an annual rate of Rs. 73 crores.

Our adverse balance of trade can be wiped out by reducing imports and increasing exports or by drawing upon accumulated exchange resources or by borrowing. Dollar imports, were, however, limited to essential commodities.

Mr. Neogy reviewed the whole situation and pointed out that the import of

capital goods and machinery had gone up from Rs. 4 *crores to 5.5 crores.* Out of the total import trade from Dollar areas, machinery accounts for 15 per cent., industrial goods for 48 per cent., consumer goods mainly food grains about 37 per cent., and luxury articles about 2 per cent. Thus, there is not much scope for reducing the imports from Dollar areas, Unless the country can grow enough food to dispense with the need for importing it. It may be noted here that India imported about Rs. 130 crores worth of food in 1948 and that the figure is likely to be larger this year as the imports are estimated at four million tons as against 2.8 million tons in 1948. It is only when the country can do without food imports that industrial progress can be speeded up.

The alternative to further cuts in import is increasing our exports. India's export had made a better showing in terms of value and to a certain extent in terms of volume too. But India's export capacity as measured by the tradition items of export cotton and jute has been crippled by partition. A disconcerting feature is that even the remaining exports show a tendency to diminish. The Commerce Minister cited the instance of seeds.

Bilateral trade agreements, which are being concluded with many countries will, we hope, help India to secure essential imports without spending dollars or gold and constitute an important method of tackling our country's balance of payment problem.

It is, therefore, gratifying to note that agreements have already been concluded with Pakistan, Belgium, Yugoslavia, Bizonia, Iran, and Iraq.

Finally Mr. Neogy pointed attention to the fact that the two countries, economically so interdependent as India and Pakistan should be drawn more closely together. He said that there was supreme necessity for having a joint economic policy between India and Pakistan. It is desirable that they should have a separate customs union for joint co-operation.

THE INDUSTRIES BILL

The Industries Bill, recently passed in the Dominion Parliament, is in consonance with the Government's industrial policy, announced in April last year. The earlier step, taken in connection with the implementation of this policy is the constitution of the Central Advisory Council of Industries and examination of the question of profit sharing. This step was really a prelude to the present bill.

According to the provisions of this bill, the Central Government are invested with powers to exercise an effective control not only over the industries, but also over a few more such as tea.

The aforesaid Bill, therefore, is a real step towards implementation of Government's industrial policy. And the industries which are now sought to be controlled under the Bill are as follows:—

(1) Aircraft, (2) arms and ammunition, (3) automobiles including tractors, (4) cement, (5) coal, including coke and other (6) electric lamps and fans, (7) electric motors, (8) heavy chemicals, including fertilisers, (9) heavy machinery used in industry including ball and roller bearing, (10) locomotives used in industry including ball and roller bearing, (10) locomotives and rolling stock, (11) machine tools, (12) machinery and equipment for the generation, transmission and distribution of electrical energy, (12) motor and aviation fuel, (13) paper and newsprint so on and so forth.

Besides the actual control of industries, the bill fully empowers the Government to get the existing undertakings registered and new undertakings licensed.

The licence of new industries will prescribe conditions as to the location and the minimum standard, in respect of size, equipment and technique to be founded by the owners.

The bill again empowers the Central Government to frame rules designed to regulate the production, provide facilities for technical training and equipment, furnish them with relevant statistics, and also regulate the use of raw materials. There is also provision for setting up a Central Inspectorate with powers of inspection and investigation of any premier unit of the controlled industry.

Central Control and regulation are indispensable, no doubt but Government should make it a point to see that powers are judiciously exercised and undesirable situations are avoided by all possible means.

INDIAN SHIPS GAINING GROUND

We are aware that in the pre-war period there was no scope for development of Indian shipping. Of course Indian ships were employed, but it is the British Shipping which occupied a dominant position. But the days of vested interests are over and the National Government are rendering all possible help and encouragement to shipping industry. Signs of rapid progress is quite visible. Mr. K. C. Neogi, the Commerce Minister recently disclosed that Indian ships were being increasingly employed in coastal trade and the present number have actually exceeded that of the foreign marine. Not to speak of coastal trade, Indian ships are taking active part in sea-borne trade as well. Strangely enough in the pre-war period India did not own a single native marine for her sea-borne trade. At present the total number comes upto 22 ships who are rendering effective service in her sea-borne trade.

Negotiations and arrangements are being briskly carried on for the purpose of establishing a shipping company.

India Government have decided to purchase its shares.

MANUFACTURE OF CANDLES

THE candle is essentially a solid, fusible and combustible matter surrounding a wick and during combustion, the molten matter ascending the wick by virtue of its capillary action is transformed into the gases which decompose liberating free carbon particles. These carbon particles raised to incandescence due to the heat of combustion produce what is called "illumination."

RAW MATERIALS

The most important raw material providing the solid, fusible and combustible matter is paraffin wax. Another important material is stearic acid or "stearine." Though candles may be made entirely of paraffin wax, it is usual to add stearine to the paraffin wax to make the stuff opaque and white. The addition of "stearine" also rectifies the tendency of pure paraffin candles to soften at temperature below their melting points. Other raw materials less important than paraffin and stearine are beeswax, spermaceti, ceresin wax, etc. Sometimes Japan wax, China wax, etc., are also employed in the manufacture of candles.

EQUIPMENTS REQUIRED

The essential equipments of a candle plant are:—

(1) Boiler to supply steam for melting the waxes and heating the candle moulds.
(2) Water supply under pressure to cool the moulds.
(3) Wick Plaiting Machine.
(4) Wick winding machine for filling the spools of the candle machine.
(5) Jacketed melting kettles.
(6) Candle machine.
(7) Tin Swimer.
(8) Tin Pouring Bucket.
(9) Scrapper.
(10) Steel Wick Knife.
(11) Thermometer.
(12) Extra fittings for repair works.

PREPARATION OF THE WICK

Wicking is made from the best quality of cotton carefully spun so as to make a uniform yarn throughout without any loose fibres or threads. The cotton is first of all bleached and then spun into yarn which is next cut into hanks of uniform length. To facilitate the combustion and prevent "smoking" the wicking is pickled by immersing the hanks in a dilute solution of mineral salts for 24 hours. The mineral salts used are borax, potassium chloride, potassium nitrate, Sal. ammoniac, Ammon sulphate and ammonium phosphate.

A standard formula of wick impregnant is as follows:—

Borax	4	oz.
Potassium Chlorate	1	,,

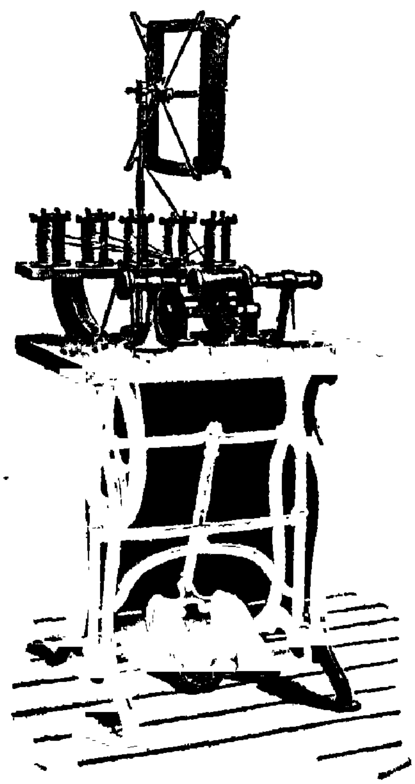


Fig. 1. Spool-Winder.

Ammonium Chloride	1	oz.
Potassium Nitrate	1	"
Water	3	qt.

Soak wicks in above solution and dry thoroughly.

The pickling also causes the wick to curve during burning and at the same time vitrify the ash. Too rapid a burning is also prevented by pickling. The hanks are then taken out of the bath and the unabsorbed liquid expelled by a centrifugal machine. They are then dried in a drying room when they present a characteristic crisp feel, they are considered ready for winding spools or bobbins.

The winding is done by a spool winder as shown in diagram by placing the hanks on the reel. The same machine is used for gathering threads from any number of spools according to the size of the wick. To make a wick of 30 threads, for example, strands made of threads from 10 spools each are placed in the wick braider as shown in the figure. The spool to receive the plaited or braided wick is inserted between the guards at the top of the machine and receives the braid formed by the automatic movement of the device carrying the spools at the base of the machine. The spool when filled with the wick thus made is ready to be inserted on the spindle of the candle machine.

SIZE OF THE WICK

The size of the wick is a very important factor in candle designing and is determined by the diameter and fusibility of the candle stock. The capillarity must be exact. If the capillarity is too great, no cup at the base of the wick will form and guttering ensues. If the capillarity is too small, the fusible composition will not melt regularly with the descent of the flame producing equally unsatisfactory results. The more fusible and combustible the candle stock, the looser should be the plait of the wick. The size of the wick is specified by the number of threads in each strand and the number of strands. The number of threads in each strand varies from 3 to 20. A 3-10 wick, for example contains 30 in total in 3 strands having 10 threads in each strand. The looseness of the plait is determined by the same conditions and varies from 4½ to 18 per inch.

MELTING THE CANDLE STOCK

The operation is performed in kettles heated by direct fire or steam. Heating by steam is always preferable and for this purpose steam jacketed kettles lined with aluminium is most suitable.

When pure paraffin wax is used in making the candle, the melting may be performed in iron or aluminium kettles. But when stearic acid is used in conjunction with the paraffin wax, wooden tubs, earthen crocks, tin, porcelain or aluminium kettles should be used as iron will discolour the stock. Lead lined tubs injure the burning quality of paraffin. Hence steam coils made of iron or lead may be used provided the coils are well under a column water over which the molten materials can float without the risk of coming in contact with them.

When paraffin and stearic acid are employed they may be melted separately or in the same vessel. Very little agitation is required to combine them when they are melted separately. When melting together, it is better to melt the paraffin first if direct heating by steam is employed. But if they are to be melted over a column of water it is immaterial which ingredient is melted first.

COLOURING THE CANDLE STOCK

The molten mass is then ready for colouring. The dye is to be uniformly mixed for getting satisfactory results.

Mineral colours interfere with the combustion of the candles and hence they should be avoided. A great variety of aniline colours are now available for this purpose. As a rule the colours in requisite amount is dissolved in a small portion of the molten mass and the solution is then strained into the main body of the fused stock and thoroughly mixed by stirring.

Stearic acid dissolves many aniline colours but its acid nature causes many of the colours to fade. If stearic acid is to be used as solvent, it should be heated to 60°—65°C and the required amount of colour added, strained and added to the main body of the molten stock. The amount of colour to be used varies between 0.05 to 0.01% of the weight of stearic acid employed according to the depth of colour desired. Overheating should be avoided as many colours are decomposed by such action and there are some colours which are so sensitive to heat that they disappear entirely when the candles are hot and fresh from the mould. The colour re-appears only when the candles are entirely cold. Some colours which are quite permanent in textiles are found to be fugitive in stearic acid. The following colours are found to give satisfactory results:—

For Red:—Sudam IV., Rhodamin, Flexin Rose, Benegal, Fuchsin.

For Yellow:—Chinolin yellow, Auramine ledern.

For Green:—Victoria green, Acid green, mixture of Victoria green and chinolin yellow.

For Blue:—Victoria blue, methyl violet, Indulin.

OPAQUE PARAFFIN CANDLES

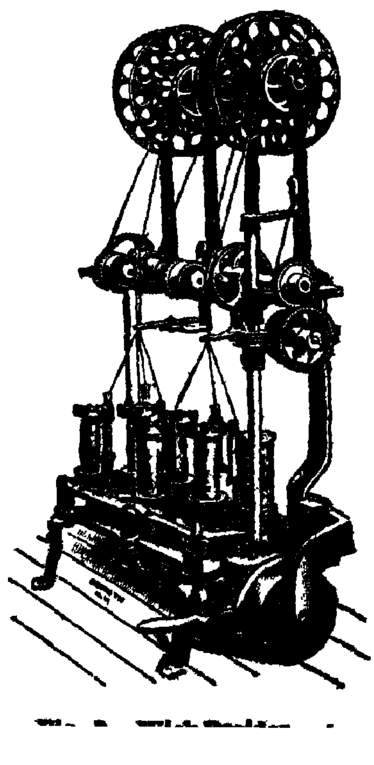
To produce opaque paraffin candles it is better to incorporate hertolan i.e. in Beta naphthol benzoate to the molten paraffin wax, by which it is at once completely absorbed as its melting point is but a trifle higher than that of paraffin. In order to ensure thorough mixing, the mass should be well stirred. . . .

Even when adding Hertolan to paraffin previously melted in boiling water, it is readily absorbed, being absolutely insoluble in water.

If ½ per cent. Hertolan is added to the molten paraffin, the mass becomes clouded, i.e., the paraffin takes on the milk-white appearance of stearine. By a 1 per cent. addition of Hertolan, the result is the same as if at least 40 per cent. stearine had been added, and the candles produced by the admixture of Hertolan are of a still whiter and more opaque appearance than if additions of stearine had been made.

The quantity of Hertolan to be added depends on the requirements and on the material employed. Generally an addition of 1 per cent. Hertolan should suffice.

The full effect does not show in the freshly made candles until after some time.



[illegible]

The effect of Hertolan is satisfactory as long as paraffin of good quality is used. Should the material assume a faint red coloration, it is attributable to the iron content of the paraffin employed.

MOULDING THE CANDLES

Before describing the actual process it would be convenient to describe in short the candle machine. The machine is essentially a series of vertical cylinders with their tops terminating in the bottom of a shallow tray. Each cylinder contains a hollow piston the head of which moulds the tip of the candle. The wicks, wound on spools placed horizontally on spindles at the bottom of the machine, are inserted through the hollow pistons which move up and down by a rack and pinion arrangement. The cylinders which may vary from 24 to 360. in number are surrounded by a chamber fitted with steam and water pipes.

SETTING UP THE MACHINE

To wick the cylinders, the lower rack is elevated by turning the crank till the tips of the pistons are in a level with the mould tops. The wicking wire which is made of copper 4 yds. long and doubled so to make a long loop, is then pushed through the hole in the piston tip so that the loop of the wire protrudes below the lower rack. The end of the wick is fastened to the wire loop and extracted by pulling upwards the wicking wire. A knot is made on the wick after which it is pulled down into the tip of the mould. It is evident, therefore, the first run of candles will be wickless.

CASTING TEMPERATURE

The temperature of the melted stock and the mould, as also the rapidity of cooling are the most important factors in the moulded candle manufacturing. Pure paraffin may be heated to 148.8°C without any risk of discolouration. But pure stearic acid must not be heated above 93.3°C when it will discolour. If they are mixed then the right temperature should be determined by experiment. Pure paraffin as well as paraffin-stearic acid mixtures should be heated to 73.8C to 87.8°C according to the composition of the mixture used. The greater the percentage of pure paraffin, the nearer the temperature may be brought towards the lower temperature level. For cooling the pure paraffin candles, the temperature of water should be 10°C to 15°C—a warmer water may be used for candles of a mixture of paraffin and stearic acid. Generally the sticking of the candles to the moulds are due to too warm or cooling water or delay in circulating it or both.

PREPARING THE MOULDS

The moulds should be heated to the same degree as the molten mass by turning on the steam pipe. The steam pipe is then closed and molten stock poured into the tray till it fills the moulds and the tray to about ½" in height. This is necessary to prevent the ends of the candles from turning hollow due to the shrinkage due to cooling. The water pipe is then quickly turned on and the chamber surrounding the moulds is filled with cold water. As soon as the stock in the tray begins to set, it should be loosened from the sides of the tray with a knife and when it gets firm it is removed with a scraper leaving the tray quite clean and the ends of the candles smooth. When the candles are cold enough, the upper racks are placed on the top of the machine in proper position. Then the cam levers of the machine is loosened till the apertures in the receiving and sliding boards are in a vertical line. The crank is then turned when the candles are lifted by the pistons clear of the lower sliding board of the upper racks. The catches are then closed and crank dropped back its

original position when the machine is ready for the next operation.

The wicks connecting the candles in the racks and the moulds must not be cut till the candles in the moulds are sufficiently hard to retain the wicks upright. The wicks are cut with a long and sharp knife and the upper racks are removed and the tray is cleansed of the excess stock for the next operation.

BLEACHING AND POLISHING

For ordinary candles, the smoothness and polish of the interior of the tin alloy mould is enough to impart a good lustre and smoothness to the candles. Exposure to sun for varying periods is the usual method employed in bleaching. To impart a better polish, a polishing machine is employed which consists essentially of two grooved wheels mounted on a horizontal shaft before which is located a feedbox into which the candles to be polished are placed. The grooved wheels carry the candles one by one from the seed box past a revolving saw which removes the butts and deposits the uniform length upon a bed plate between the rods of an endless frame with linked sides, kept in motion by cog wheels. The candles roll over these bed plates under a revolting buffer moving at right angles to the endless belt carrying the candles, which gives them a vigorous brushing from end to end and imparts thereby a beautiful porcelain finish as the candles pass toward the end where they roll off into the parker's box.

TYPICAL RECIPES

The following are a few recipes for candle composition. The general method of preparation is the same as outlined above.

I.

Paraffin wax	60 parts.
Stearic acid	40 ,,

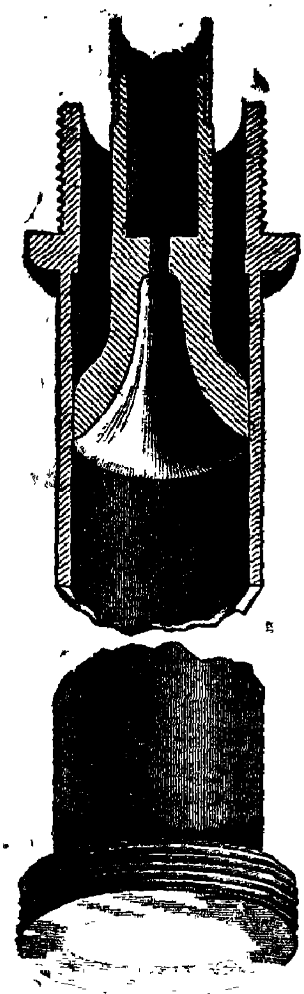


Fig. 3. Single Candle Mould.

Melt together and stir thoroughly till a clear melt is obtained. If coloured candles are desired, the colour may be added at this stage according to the method already described. Pour into moulds fitted with wicks and chill by a running stream of cold water.

II.

Paraffin wax	55 parts.
Stearic acid	40 ,,
Beeswax	5 ,,

Melt the ingredients together over water and proceed as above.

III.

Beeswax	69 parts.
Stearic acid	20 „
Paraffin	10 „
Monoethyl ether of ethylene glycol	1 part.

Method as above, only add the ether when the waxes are melted.

IV.

Beeswax	70 parts.
Stearic acid	20 „
Paraffin wax	10 „
"Cellosolve"	1 part.

Melted as above.

V.

Paraffin wax (50°-52°C M.P.)	79 parts.
Stearine	19.5 „
Carnauba wax, bleached	1.5 „

Melted as above.

VI.

Paraffin wax	49 parts.
Hydrogenated vegetable oil	51 „

Melted as above. This will burn for a longer time than ordinary candles.

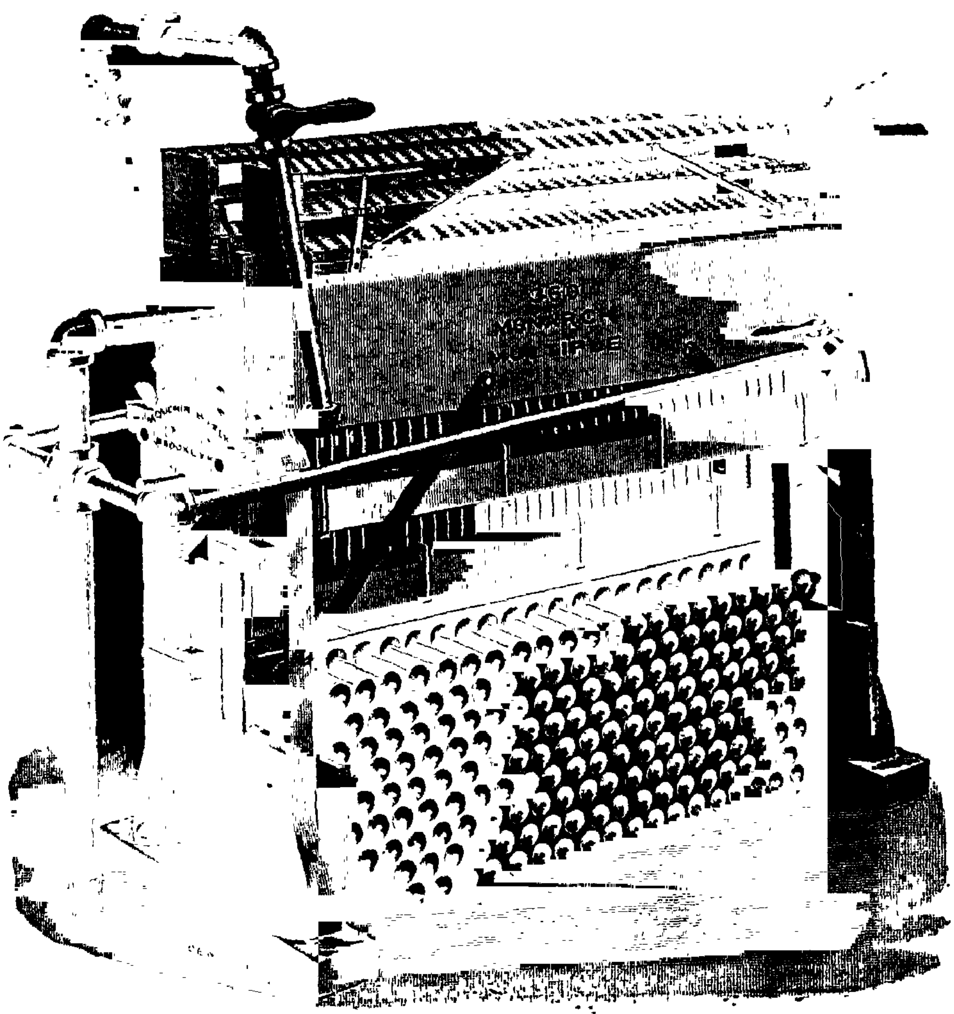


Fig. 4. 360-Mould Multiple Candle-Machine.

TRANSPARENT CANDLES

I.

Paraffin wax	70 parts.
Stearine	15 „
Petroleum	15 „

Melt together paraffin wax and stearine in a steam jacketed aluminium kettle and when molten add the oil and stir thoroughly to make a uniform mixture. Pour into moulds.

II.

Paraffin wax	90 parts.
Stearine	5 „
Petroleum	5 „

Process as above.

To prevent the trickling of burning candles, the candles may be dipped in the following mixture:—

Magnesium sulphate	15 parts.
Dextrin	15 „
Water	100 „

The solution dries quickly and does not affect the burning of the candles.

COLOURED FLAME CANDLES

The coloured flame is produced by the addition of some metallic salts in the candles composition which volatilise during combustion producing characteristic flamed colours. The followings are recipes from the German Patent No. 646,129.

RED LIGHT.

Paraformaldehyde	30 parts.
Paraffin Wax (Scale)	5 „
Lithium Chloride	0.1 part.
Menthol	0.2 „
Coumarin	0.2 „
Lithium Nitrate	0.025

BLUE LIGHT.

Paraformaldehyde	30 parts.
Paraffin Wax (Scale)	3.5 „
Copper Chloride	3.5 „
Menthol	0.2 part.
Coumarin	0.2 „

GREEN LIGHT.

Paraformaldehyde	30 parts.
Paraffin Wax (scale)	3 „
Copper Chloride	0.05 part.
Barium Nitrate	0.4 „
Boric Acid	0.3 „
Menthol	0.2 „
Coumarin	0.2 „

The mixtures are pressed into the shape of candles, without wicks.

The candles are wrapped in a thin cellulose fibre foil, and covered with a thin coating of paraffin to give the impression of real candles.

MANUFACTURE OF CHARCOAL.

THE manufacture of charcoal, or charcoal burning as it is more popularly called, is a form of destructive distillation of wood, and consists in burning wood out of contact with the air. If wood is burnt in the presence of air it is converted into various gases which go off in the form of smoke, and only a small quantity of ash is left behind as a residue. If the air is almost excluded at the time of burning, combustion is largely retarded and the wood is only partially carbonised or burnt, the solid residue left behind being known as charcoal.

METHODS OF MAKING CHARCOAL

There are three methods of making charcoal, viz.:—

1. Burning in open pits.
2. Burning in retorts.
3. Burning in kilns.

BURNING IN PITS.

This is a very simple method of obtaining charcoal but it is regarded as a very wasteful process and is never profitable on a large scale manufacture. It has the advantage, however, of producing charcoal in a very short time, and very

little skill is required to carry it out. A hole about 5 or 6 feet across, with sloping is dug in the ground to a depth of about 4 or 5 feet. This is filled with dry sticks and twigs which are then kindled and allowed to burn, until all smoke has ceased. More twigs are then thrown in and the operation is repeated, until the pit is full of glowing charcoal, when it is covered over the turf or mud so that all air is excluded. It is then left to cool down, and at the end of a day or two it is opened up and the charcoal removed. The charcoal thus made is not of good quality, being burnt half the time with free access to the air, but this method has the advantage of turning out small charcoal quickly without any lengthy preparations, so that if charcoal is required at once for some special purpose, it is often adopted.

BURNING IN KILNS

Burning in kilns is mainly carried out in forests. The method employed may vary from place to place but in principle it is the same in all cases. Before describing briefly the construction of a suitable type of kiln, the following general rule must be understood.

In the first place, all the wood used should be carbonised as far as possible simultaneously, otherwise the first pieces alight would be completely burnt up before the last pieces alight are half carbonised. To ensure even carbonisation, the pieces of wood used should be as uniform in size as possible, and no unsound wood should be included. The ideal method is to use billets of one species only, or different species of approximately the same density. In order to allow as little air as possible in the kiln, the billets of wood should be dressed straight and stacked as close together as possible. The method of stacking may vary with different types of kilns, the shape of the kiln has an important bearing on this point.

The different types of kilns used in India, as described in "Manual of Indian Forest Utilization" by H. Trotter are as follows:—

1. The paraboloidal over ground kiln.
2. The over kiln.
3. The pit kiln.
4. The presmatic kiln.
5. The hill kiln.
6. The portable metal kiln.

THE PARABOLOIDAL OVER GROUND KILN

Of the above six types, the paraboloidal kiln is the most commonly used in India and is described in detail here. It is constructed in the shape of a paraboloid. In size these kilns vary considerably, depending on the amount of charcoal required at a time. A convenient size of kiln is one with a radius of 8 to 10 feet and about 8 feet high. This gives a capacity of roughly 800 to 1200 stacked cubic feet.

SITE—The site for a paraboloidal kiln must be level and even, and should be in a sheltered place near to water. The soil should not be too stiff nor too porous, a sandy loam being about right. If too porous it allows air to penetrate, and if too stiff it does not absorb the liquid products of carbonisation. All vegetable should be removed by the roots, and the ground should be uniform with the centre of the site raised about 8 inches and sloping evenly to the circumference, so that any liquid products not absorbed by the soil can run out to the edge. If the site is at all damp, dry leaves should be burnt on it, in fact the best site of all is an old site which has been previously used for charcoal burning.

BUILDING THE KILN—The kiln is usually built up with two tires of vertical billets and a top layer of horizontal billets. If the vertical billets are cut 3 feet long and the horizontal billets are stacked 2 feet deep, the kiln will then be 8 feet high which is a convenient height. Before

stacking is begun, it is necessary to construct a chimney up the centre. This is done by driving three stakes into the ground in the centre of the site, the stakes being a foot apart and forming an equilateral triangle. These stakes, which should be at least as high as the top of the kiln, are then bound round with twisted grass so as to from a hollow chimney. The chimney is then filled up with dry grass, straw, twigs and other easily burnt materials.

This kiln may be fired from above or from below. If firing from below is intended, a narrow passage must be left from the centre chimney to the outside of the kiln. This is usually done by laying a straight pole along the ground, and stacking billets in the form of an X above it, the pole being withdrawn when the stacking is completed thereby leaving a horizontal flue below the billets. To insure a correct shape for the kiln, the circumferance is marked out on the ground with pegs in the form of a circle.

Stacking then commences from the centre, with a few thin billets placed round the centre chimney to ensure easy firing. The other billets, all cut to length and trimmed, are then stacked as closely as possible round the centre. The thick end of the billets should always be on the ground, so that the thin ends are sloping slightly inwards of giving the paraboloidal shape to the kiln. The thickest billets should be stacked about half way out from the centre, this being the place where the heat is greatest, and all interspaces should be filled up with small chips and pieces of wood.

The second tier is stacked in exactly the same way as the first, always bearing in mind the correct slope and shape of the finished pile.

The third tier is stacked with the billets lying horizontally on the second tier, various lengths being used to give a rounded top to the stack.

COVERING THE KILN:—The best covering for a kiln of this type consists of two separate layers. The inner layer is usually made of turf, green grass, leaves, ferns, or moss, and well-packed to hold up the outer layer which is made of wet earth, or preferably of fine earth and charcoal dust mixed. This outer covering is plastered all over the kiln so as to exclude all air. This type of covering has been found quite satisfactory as it is fairly substantial and air-tight, and at the same time it is pliant enough to give slightly as the interior stack subsides during the burning.

The outer covering is sometimes kept in position by horizontal poles supported by upright forked sticks, two or three tiers sometimes being employed.

FIRING THE KILN:—Firing is usually done from the bottom of the kiln, as the fire then spreads quickly outwards and upwards throughout the kiln whereas firing from above often results in the fire failing to reach the lowest parts, resulting in incomplete carbonisation of the charge. Firing from below is done by pushing a pole, with a bundle of burning straw tied to the end of it, along the passage left for the purpose under the X-stacked billets of the bottom tier. The material in the chimney is thus set alight, and the surrounding billets begin to burn. To ensure the kiln being well alight, more dried shavings, straw and chips of wood are pushed into the chimney from the top, and when these have burnt up the chimney is filled up with short billets, to prevent the stacked material from falling in.

The lighting passage is then also filled up with billets, and if the kiln is well alight the entrance to the firing passage, as well as the top of the chimney, are covered over with grass and mud.

THE BURNING OF THE KILN:—When the kiln is well alight, the fire spreads outwards from the centre in the form of an inverted cone with the base gradually widening outwards. Theoretically, burning should proceed evenly all round the kiln but in practice this seldom happens. The first sign that burning is in progress is a bluish-grey vapour issuing from the surface of the kiln, and if all is well this is shortly followed by a thick pungent yellowish-brown smoke which continue till carbonisation is complete, when a clear blue flame appears all over the kiln.

The time taken to complete carbonisation naturally varies with the size of the kiln, the size of the billets, and other factors, but the usual period is from about 7 to 10 days for a normal kiln. During the whole of this time the progress of the burning has to be carefully watched and controlled, and the quality of the charcoal made depends almost entirely on the skill and care of the burners during this time. If burning proceeds too quickly the outer covering of the kiln has to be thickened. If burning is too slow small holes are made with a stick, just in front of the line of burning, to allow some air to enter and accelerate combustion. These holes are filled up as soon as a blue flame emerges. All cracks and hollows formed by the subsidence of the outer covering, due to the loss of volume of the burning stack, must be filled up at once.

OPENING THE KILN:—When the clear blue flame has appeared right down at the base of the kiln, carbonisation is complete, but the kiln is not opened at once as the charcoal would burst into flames. Very often a week or more is allowed to pass before the kiln is opened, and even then, the opening is a time of great anxiety and has to be carried out with the utmost care. For this reason, the opening if often done at night, when smouldering pieces of charcoal can be seen at once. A small hole is usually made first in the side of the kiln, and some charcoal is raked out and the hole quickly covered up. If all is well this is repeated round the kiln, until all the charcoal has been extracted. If any of the extracted charcoal is glowing, it is at once covered with wet earth or sprinkled with a little water. Water should be used sparingly as excessive water spoils the quality of the charcoal. When the charcoal is cool enough to handle it is sorted and put away cover and the operation is completed.

BURNING IN RETORTS

Many forms of retorts are used; they are generally made of boiler plates and set horizontally although cast iron is also used as a material and the setting is vertical in many cases. The size varies conderably, but 3 feet diameter by 8 feet long is not unusual. The charge for a retort of this size is about 6 cwts. The retorts are heated by the flame of the gas evolved from distillation, supplemented by a little wood or charcoal.

After the wood has been placed in the retort and the heating started, the water contained in the wood is first driven off; when this is accomplished the destructive distillation of cellulose and lignin begins and will be indicated by the non-condensable gases and by the appearance of the socalled pyroligneous acid, a brown liquor of characteristic odour, in which considerable tar is found. When the temperature reaches 270°C an exothermic reaction sets in which supplies most of the heat necessary for the distillation process. The end of the process will be indicated by the cooling of the pipe which connects the retort with the condenser.

In carrying out this distilling process on a commercial scale the three phases of this distillation, namely: the expulsion of the water, the heating of the wood to the

point at which the exothermic reaction sets in, and the completion of the process by means of the above reaction, will not necessarily take place consecutively, owing to the fact that the large sized apparatus used will not allow the heat to be transmitted uniformly to all the wood in the vessel. Hence part of the wood situated near the heating surface may be in the third phase of the process, whilst that not so near the source of heat may be still in the first phase.

ROUND RETORT SYSTEM.

The round retorts are heated slowly and the distillation is continued for from twenty to thirty hours, the progress being indicated by the flow of liquor and the gradual heating of the front of the retort from top to bottom. When the entire front of the retort has reached a fairly uniform temperature, the fires are allowed to die down and when the retort or ovens are sufficiently cool the charcoal is removed. The time required for distillation as already stated varies from twenty to thirty hours, and averages about twentyfour hours. The distillate from the retorts passes to the condensers. When the acid, alcohol and other valuable constituents are condensed to liquid form and then carried to a large wooden settling tank where it is allowed to stand for several days in order that the tar may settle. The uncondensed gases pass from the condensers to the gas mains, and are carried either directly to the furnace and burnt there or go to a gas holder from which they are used. If the tar is not otherwise treated, it is blown under the boilers with a steam jet and burnt.

YIELD OF QUALITY OF CHARCOAL

The actual yield of charcoal from a known amount of wood varies with the species of wood used and the method of carbonization employed. Dry wood produces more charcoal than wet wood of the same species, but a fairly yield of charcoal from any wood may be put at between 20 to 30 per cent. of the original weight.

The quality of charcoal naturally varies with different species. All woods produce charcoal of a kind, but the most important factor for a given species is the skill and care with which the burning is carried out. Good charcoal is dry, black, porous, but fairly hard substance and should exhibit the following qualities:—

(1) A black and glistening appearance with a bluish tinge.

(2) It should give a clear metallic note when struck on a had object.

(3) It should be free from taste and smell.

(4) Small pieces should adhere to the tongue.

(5) It should be possible to rub the transverse face without soiling the fingers.

(6) It should be easy to light and should burn quietly without the production of smoke or flame.

Charcoal which has not been completely carbonised is reddish in colour and burns with much smoke. It is then known as foxy charcoal.

CONCLUSION

The superiority of charcoal over ordinary wood is due to the intense, steady and prolonged heat obtained from it, the case with which it lights, and the absence of any smoke when it burns. For these reasons, it is extensively used for ore-smelting and for blacksmith's and metalworkers' forges. Fine powdered charcoal is also used in the manufacture of black gun powder. It is sometimes employed for cooking and heating and other domestic purposes, and is perhaps the most extensively used of all minor forest products in this country.

PREPARATION OF ANALGESIC BALMS

ANALGESIC balms or chest rubs are one of the most useful articles indispensable for every home especially in winter season. Except for improved bases and an occasional new active agent, preparations of this sort have been in use for centuries to alleviate colds and for the relief of aches and pains.

These ointments or medicated creams as they are occasionally called, are intended primarily for applications of the chest, back and around the throat, but are also useful when rubbed on other parts of the body. Chest rubs containing mustard oil are generally intended for use in the treatment of chest colds, local congestions, coughs due to colds and minor throat irritations. Such compounds are also used to improve local circulation and to relieve the painful symptoms of neuralgia, muscular aches and pains. The following extract from PHARMACY INTERNATIONAL will give upto-date formulas and methods of some of the best types of these ointments.

VAPOUR TYPE CHEST RUBS

The vapour type chest rubs are said to provide a two-way action. Such a product acts directly on the skin to produce a local hyperemia and at the same time releases vapours that are soothing to the respiratory passages. This type of rub generally contains menthol and camphor, usually with methyl salicylate, as the active ingredients. They find their greatest employment for the relief of head colds and nasal irritations and as aids in treating chest colds, throat irritations and coughs due to colds. The beneficial vapour action can also be obtained, in cases of nasal irritation or head colds by applying a little of the ointment to the nostrils.

COUNTER-IRRITANT DRUGS

Chest rubs and analgesic balms act to relieve pain by one of the oldest principles in therapeutics—that of counter-irritation. Counterirritant drugs, used to produce characteristic stimulating effects on the skin, cause local and remote effects. The local effects are a warm sensation with redness and hyperemia over the area of the skin where the application is made. The remote effect is relief of pain and inflammation in internal organs situated in the same part of the body in which the preparation is applied. Thus a counter-irritant applied on the upper part of the chest will relieve pain in the broncho and lungs. Effects of this kind result from circulatory and reflex responses.

The test of time has proved that counter-irritation applied locally often relieves pain arising from neighbouring or deep-seated lesions. Counter-irritation involves the stimulation of cutaneous sensory nerves to bring about a physiologic response in the deeper organs or tissues.

Pharmacologists differentiate four different degrees of counter-irritation from the application of various drugs. The mildest degree of counter-irritation is rubefaction. These are used: (a) to relieve pain and tightness in the chest and congestion and inflammation in the lungs, (b) to relieve pain and discomfort and distention of the stomach and intestines and other remote organs, (c) to relieve muscular pains and swelling of inflammed joints, (d) to relieve the pain of contusions or sprains, and (e) to accelerate healing of tissues by improving their circulation.

ACTIVE AGENTS

In so far as chest rubs and analgesic ointments are concerned, the most important active ingredients are methyl salicylate, menthol and camphor. When materials of this sort are mixed, they have a definite influence upon each other with regard to speed and duration of action.

Of interest in this connection are the observations made by Beutner and his co-workers on methyl salicylate ointments made with and without menthol. They found that the presence of menthol promotes greater absorption of the salicylate.

MUSTARD OIL

As already indicated, mustard oil is present in a number of chest rubs. It is a powerful irritant and the amount present in a number of chest rubs. It is a powerful irritant and the amount present in a rub must be limited to a low proportion. When preparing chest rubs, particularly those containing mustard oil, it is common practice for manufacturers to dispense products with lower proportions of active ingredients. These less strong ointments are intended for children and those with delicate skin.

In addition to these more familiar agents, rubs and balms may contain adjuncts, like chloral hydrate, thymol, guiacol, eucalyptol and various essential oils.

BASES OR VEHICLES

Much has been said during recent years concerning the influence of the ointment bases or vehicles on the availability or medicaments to the skin.

Many types of materials are used as bases for chest rubs and analgesic balms. These include the old-fashioned fatty bases as well as cold creams, petrolatum, petrolatum-lanolin mixtures, lanolin and a number of more modern vanishing type bases.

A few typical old-fashioned chest rubs are as follows:—

I.

Benzoated lard	400 parts.
Olive oil	100 „
Mace oil	36 „
Eucalyptus oil	10 „
Tincture of benzoin	15 „

II.

Camphor	4.0 Gm.
Guiacol	1.0 „
Methyl salicylate	3.0 „
Sulphated hydrogenated castor oil, to make	60.0 Gm.

COLD CREAM BASE.

Cold cream is frequently used as a base in making rubs and balms. A few formulas and procedure are as follows:—

I.

Lanolin, anhydrous	2 lb.
Petrolatum	13 oz.
White beeswax	10 oz.
Water	10 fl. oz.
Borax	¼ oz.
Menthol	1 oz.
Methyl salicylate	4 fl. oz.
Oil of mustard, artificial	¼ oz.
Capsicum oleoresin	15 gr.

Melt the beeswax on a water-bath, add the lanolin and petrolatum and mix with continued heating. Separately dissolve the borax in the water with the aid of heat. Pour this solution into the wax-lanolin mixture, stirring until a perfect combination is formed. Remove from the heat and add the menthol. Stir until the product begins to thicken, then add the methyl salicylate and the capsicum oleoresin which has been rubbed up with the mustard oil. Mix well and fill into tubes while still warm.

II.

Petrolatum	200 parts.
Mineral oil, heavy	200 „
Eucalyptus oil	50 „
Menthol	10 „
Oil of turpentine	10 „

III.

A smooth, easy-spreading chest rub may be obtained with the following combination:

Petrolatum	200	parts.
Mineral oil, light	300	"
Spermaceti	100	"
Stearic acid	40	"
Menthol	10	"
Camphor	10	"
Eucalyptol	40	

PETROLATUM AND LANOLIN MIXED.

A number of chest rubs and analgesic balms are compounded with bases made with mixtures of petrolatum and lanolin.

As is well known, combinations of lanolin and petrolatum are used in the production of absorption bases, which are capable of taking up considerable quantities of water. This property may be used to make water-containing analgesic ointments that are smooth, creamy and easy to apply. Such a preparation is illustrated in the following analgesic balm which, in addition to the standard active ingredients, also contains ethyl aminobenzoate as a local anesthetic:—

Lanolin, anhydrous	45.0
Petrolatum, yellow	25.0
Menthol	2.0
Ethyl Aminobenzoate	2.5
Methyl salicylate	7.5
Water, distilled	18.0

Triturate the ethyl aminobenzoate with a portion of the petrolatum until smooth. Gradually add the remainder of the petrolatum and the lanolin. Dissolve the menthol in the methyl salicylate and add the solution to the previous mixture, triturating until thoroughly mixed. Finally add the water and mix until homogeneous. Fill into tubes or jars.

LANOLIN BASE.

Lanolin, by itself, is very extensively used as a vehicle for rubefacient drugs. Indeed, several of the best known proprietary analgesic balms are formulated with lanolin bases. Lanolin has a reputation for its ability to facilitate absorption and to promote good local and systematic effects. Thus, in their studies on the absorption of methyl salicylate by inunction, Beutner and his associates employed the following analgesic ointment as a representative preparation:—

	Per cent.
Lanolin	60
Menthol	20
Methyl salicylate	20

NON-GREASY BASE.

Stearic acid, double pressed	60	oz.
Glycerine	40	fl. oz.
White mineral oil	40	fl. oz.
Water	276	fl. oz.
Ammonia 26°	6	fl. oz.
Menthol	3	oz.
Methyl salicylate	12	fl. oz.
Oil of mustard, artificial	½	oz.
Capsicum oleoresin	30	gr.

Melt the stearic acid. Heat the water to 160°F. and add the ammonia. Pour this solution into the melted stearic acid and stir until smooth. Stir in the glycerine and mineral oil. Remove from heat source, add the menthol and, as the product begins to thicken, add the methyl salicylate and the capsicum previously rubbed up with the oil of mustard. Mix thoroughly and fill into tubes.

If a more emollient action is desired, some lanolin or similar acting material may be added. Indicative is the following formula for a chest rub.

Vanishing cream	600	parts.
Lanolin	100	"
Mustard, ground	150	"
Camphor	20	"
Methyl salicylate	30	"

SOLID OPODELDOCS.

Menthol	4.00	parts.
Camphor	8.00	„
Oil of turpentine	4.00	„
Oil of eucalyptus	2.00	„
Oil of thyme (white)	1.00	part.
Alcohol	78.50	parts.
Stearic acid	4.87	„
Sodium Hydroxide	1.10	„
Amber dye solution	2.50	„

When the stainless cake or stick is rubbed on the skin, the contacting portions liquefy under the heat of the body. A sensation of colouring is produced at first, followed by a feeling of warmth and a flushing of the skin. This, of course, is the usual reaction to a rubefacient product, but the moulded form is claimed to offer a number of conveniences with regard to application and efficiency.

INK EXTRACTS & POWDERS.

Of late attempts have been made to bring inks upon the market in concentrated forms which would yield a good ink directly they were mixed with water. Although these preparations do not actually produce good results, yet the people living in far off places and especially the school children are very fond of these cheap inks.

INK EXTRACTS.

Ink extracts can be very easily made by evaporating inks to a certain concentration and then bottling them. The process, however, varies in difficulty according to whether the ink owes its colour to dissolved or suspended matter. With the latter kind it is best to concentrate the gall decoction by itself in a shallow pan, but without boiling it, down to about one-quarter of its original volume. The other ingredients are then dissolved in it. The result is a syrupy liquid which gives a good ink with from 5 to 8 times its volume of water.

If an extract, an alizarin ink is wanted, the ink is prepared according to the following recipe and carefully evaporated,

ALIZARIN INK EXTRACT.

Galls	20	parts.
Ferrous sulphate	12	„
Gum arabic	2	„
Acetic acid	200	„
Acid dyestuff	40	„

Soak the powdered galls in the acetic acid; draw off the solution after a few days and dissolve the ferrous sulphate and the gum in a part of it, which is then added to the rest. Finally add the acid blue of indigo carmine.

To make concentrated ink it should be carefully evaporated. For this purpose earthenware vessels should be used, as those of iron or copper are attacked by the acid in the ink. When, too, the ink during evaporation becomes turbid owing to loss of acetic acid, a little of the strong acid should be put in. By observing this precaution, and also by evaporating at a low temperature the ink can be made very concentrated indeed, and can then be bottled and diluted with water for use.

Logwood chrome inks and horse chestnuts inks can be evaporated to very thick syrups without their quality being in the least impaired or the readiness with which the extract gives an ink with water being affected.

LOGWOOD WRITING INK EXTRACT.

Logwood extract	70	parts.
Potassium dichromate	2	„
Chrome alum	50	„
Oxalic acid	10	„
Salicylic acid	1½	„

LOGWOOD COPYING INK EXTRACT.

Logwood extract	100	parts.
Aluminium sulphate	40	„
Potassium oxalate	40	„

Potassium bisulphate	20	parts.
Potassium dichromate	3	,,
Salicylic acid	1½	,,

INK POWDERS.

These powders make ink when dissolved in water. Most inks may be obtained in the form of powder by various sample devices.

TANNIN & GALLIC ACID INK POWDERS.

The galls either fermented or unfermented are extracted with boiling water in the quantities and in the usual manner of making tannin inks. The filtered decoction is carefully evaporated to a syrup. At this stage, constant stirring is begun, and kept up until the contents of the pan are quite dry. The temperature must be kept as low as possible to avoid burning of the ink. In the mean time the ferrous sulphate and the gum arabic are made perfectly dry, and are ground together to a fine powder. They are then mixed with the dry gall decoction. The brown mixture obtained is put at once into well-stoppered bottles, as it is very hygroscopic. A pinch of this powder immediately converts into ink the water in which it is stirred.

LOGWOOD CHROME INK POWDER.

This is made by carefully evaporating the ink to dryness or more simply by finely powdering very dry logwood extract and grinding it up with potassium chromate.

All ink powders should be put on the market and kept in bottles with ground in stoppers, or in airtight packets, for although their quality is not deteriorated by the absorption of moisture from the air, they form lumps which are difficult to remove from the receptacles.

CARTONS FOR INK POWDERS.

The following process for making cartons or card boxes which will protect ink powder perfectly from damp can be confidently recommended. Heat paraffin wax to about the temperature of boiling water, and fill the box and its lid with it, and then pour it out at once. The sides of the box thus become perfectly airtight, so that it will keep ink powder quite dry, even in a damp room.

The chief points in the manufacture of ink powder are to keep the temperature of evaporation and drying so low that no burning can possibly happen, and to see that the ingredients are in a state of perfectly uniform mixture.

FRICK'S INK POWDER.

Gallnut powder	42	parts.
Ferrous sulphate	30	,,
Gum arabic	15	,,
Alum	6	,,

The galls are ground up finely with the alum. The gum arabic and the ferrous sulphate are powdered separately, and then mixed with the rest. The powder is at once packed or bottled. The ink made by adding this powder to water gives a black sediment, from which it must be decanted. It is possible, however, to make an ink powder which is entirely soluble by infusing the galls with water, evaporating the solution to dryness, and grinding up the residue with the other ingredients. The object of the alum in the recipe is to prevent moulding. If it is replaced by bored or salicylic acid, the acid chosen need only be about 1/10 per cent. of the powder.

PRECISION INK POWDER

Gall extract	150	parts.
Ferrous sulphate	25	,,
Copper sulphate	5	,,
Alum	10	,,
Gum arabic	10	,,

These ingredients, made absolutely dry and perfectly mixed together, give a powder which produces with water a very fine black ink of excellent quality.

HELL'S TANNIN INK POWDER

Tannin	90	parts.
Ferrous sulphate powdered	90	„
Sodium chloride	40	„
Potassium bisulphate	15	„
Sugar	40	„
Indigo carmine	5	„
Benzoic acid	3	„

The ink is made by dissolving 150 parts of this powder in 1000 parts of water.

GALL COPYING INK POWDER.

Oxidised tannin	1000	parts.
Sugar	60	„
Gum arabic	200	„
Ferrous sulphate, powdered	250	„
Carbolic acid	10	„
Acid blue	50	„

For use as a copying ink the mixture is stirred up with five to six times the quantity of water. The so-called oxidised tannin is made by dissolving 500 parts of tannin and 50 parts of oxalic acid in a mixture of 400 parts of water, 50 parts of sulphuric acid, and 50 parts of glycerin, heating the mixture for 3 days on the water-bath, and then evaporating it to dryness.

BLUE-BLACK OFFICE INK POWDER

Tannin	60	parts.
Ferric sulphate, powdered	20	„
Potassium bisulphite	2	„
Sugar	10	„
Soluble aniline blue	5	„

For use the powder is boiled for 15 to 20 minutes with 1250 parts of water.

BLUE INK POWDER

Resorcin blue	6	parts.
Sugar	20	„
Oxalic acid	1	part.

The mixture is dissolved in 1000 parts of water.

RED INK POWDER

Eosine A	25	parts.
Sugar	30	„

Dissolve the mixture in 1000 parts of water.

VIOLET INK POWDER.

Methyl violet 3 B	10	parts.
Sugar	10	„
Oxalic acid	2	„

Dissolve in 1000 parts of water.

BLACK INK POWDER

Deep black E	20	parts.
Sugar	20	„
Potassium bisulphate	1	part.

Dissolve in 1000 parts of water.

LOGWOOD INK POWDER

Logwood extract	500	parts.
Potassium chromate	1	part.

Make the extract into a syrup with hot water, and stir in the chromate in concentrated solution in hot water. Evaporate to dryness with constant stirring, grind, and pack while still warm.

BLUE-BLACK

Naphthol Black Aniline	2	oz.
Oxalic Acid	1	„
Gallic Acid	2	„
Molybdic Acid	2	„
Blue Aniline	1	„

Mix well. 1 oz. of the powder will give 16 oz. of ink.

PALE BLUE-BLACK

Gallic Acid	2	oz.
Green Copperas (Dry Powder)	3	„
Blue Aniline	1	„

Mix well. 1 oz. of the powder will give 16 oz. of ink.

STYLOGRAPHIC BLUE-BLACK

Magenta Aniline	½	oz.
Green Aniline	½	„
Oxalic Acid	1	dr.

Mix well. This will give 8 pints of stylographic ink.

Pharmaceutical Recipes

COMPOUND INFUSION OF CHIRATA (I.P.L.).

Chirata, cut small	100	grams.
Dried, Sweet Orange Peel	100	,,
Lemon Peel	200	,,
Alcohol (25 per cent.)	1200	c.c.

Macerate, in a covered vessel for 48 hours, the chirata, orange peel and lemon peel with 800 c.c. of the alcohol; press out the liquid. To the pressed merc, add 400 c.c. of the alcohol; macerate for 24 hours; press; add the liquid to the product of the first pressing. Set aside for not less than 14 days; filter.

Dose: 30 to 60 mins.

SACCHARIN-SODA TABLET

Saccharin	8	oz.
Sodium bicarbonate	8	,,
Milk sugar	4	,,

Granulate the saccharin and milk sugar with mucilage of acacia, 10 per cent. Mix the dry granulation with the sodium bicarbonate granulation.

Compressed into 1½ gr. tablet by means of 7-32 inch die.

To produce sodium bicarbonate granulation spray acacia solution, 20 per cent. strength, sufficient to moisten. Then granulate and dry at a low temperature (about 110°F) and the heating discontinued as soon as the granulation is dry, in order to prevent discoloration.

TONIC

Gulancha	1	dr.
Chirata	1	,,
Ginger	1	,,
Water	1	pint.

Boil down to half.

Dose:—1 ounce after fever as a tonic.

GLYCERINE OF BORIC ACID (B.P.)

Boric acid 310 grms.

Glycerin, sufficient to produce 1000.

Heat 460 grms. of glycerin to a temperature between 64° and 150°C, add the boric acid, and heat until dissolved, stirring constantly; evaporate at a temperature not exceeding 150°, until the weight of the mixture has been reduced to 520 grammes, the stirring being continued. Add sufficient warmed glycerin to produce the required weight; mix thoroughly.

TABLETS FOR URINARY TROUBLES.

Cubeb powdered (No. 100)	1	lb.
Balsam copaiba solidifiable	1	,,
Iron sulphate, dried	4	oz.
Venice turpentine	4	,,
Sandalwood oil	4	,,
Wintergreen oil	700	mins.
Calcined magnesia	8	oz.
Starch	1½	lbs.
Cane sugar	1	lb. 7 oz.
Acacia-starch paste	12	oz.

Reduce the copaiba and venice turpentine to about one pound, on a steam-bath or over a low heat. Remove the heat and stir in the calcined magnesia. Cool, powder, triturate with the other powders and granulate. Mix the oils of sandal wood and wintergreen with sufficient bland oil, and put one drop on each tablet or spray.

Make 7 gr. tablet each by using die 13-32 inch.

CATARRH INHALANT

Menthol	320	gr.
Pine oil	160	mins.
Lavender oil	80	,,
Cinnamon oil	30	,,
Origanum oil	144	,,
Eucalyptus oil	120	,,
Liquid formaldehyde	40	,,
Rectified spirit	8	oz.

Mix.

GRIPE SYRUP (INFANTS' CARMINATIVE)

Sodium bromide	40	gr.
Sodium bicarbonate	40	,,
Spirit ammon aromatic	20	mins.
Spirit Rectified	20	,,
Amethi oil	5	,,
Anise oil	10	,,
Simple syrup	2	oz.
Distilled water to produce	5	,,

Mix.

Dose:—10 to 30 minims.

DYSENTERY CURE

Castor oil	1	oz.
Gum acacia	3	dr.
Sugar	3	,,
Caraway water	4	oz.

Add 1 ounce of the water to the gum. Then add oil gradually and stir. Then add water to make 4 oz.

Adult dose:—15 drops to 1 dram.

Recipes for Small Manufacturers

CANDLES.

Paraffin wax	30	oz.
Stearic acid	17½	„
Beeswax	2½	„

Melt together and stir until clear. If coloured candles are desired a pinch of any oil soluble dye is dissolved at this stage. Pour into vertical moulds in which wicks are hung.

WHITE SHOE DRESSING.

Lithopone	19	oz.
Titanium dioxide	1	„
Bleached shellac	3	„
Ammonia fort	¼	fl. oz.
Alcohol	25	„
Water	25	„
Glycerin	1	oz.

Dissolve the last four ingredients by mixing in a porcelain vessel. When dissolved stir in the first two ingredients. Keep in stoppered bottles and shake before using.

HOUSEHOLD BAKING POWDER.

Soda bicarbonate	28	oz.
Mono calcium phosphate	35	„
Corn starch	27	„

Mix the above powders thoroughly in a dry can by shaking and rolling for 30 minutes. Pack into dry air-tight tins as moisture will cause lumping.

FOOT POWDER.

Foot powders consist of a filler such as talc or starch with or without an antiseptic or deodorizer. In the following formula the borax liberates oxygen, when in contact with perspiration which tends to destroy unpleasant odours. The talc acts as a lubricant and prevents friction and chafing.

Borax	3	oz.
Zinc peroxide	2	„
Talc	15	„

Shake together thoroughly in a dry container until uniformly mixed. This powder must be kept dry or it will spoil.

TAILORS' CHALK

Tailors' chalk may be prepared of different colours as follows:—

YELLOW

Chalk powdered	28	parts.
Soapstone	18	„
Pipe clay	10	„
Yellow ochre	7	„
Lemon chrome yellow	1½	„

Make into a paste with water and mould.

WHITE

French chalk	20	parts.
Pipe clay	20	„
White curd soap	6	„

Make into a stiff paste with water and dry.

BLACK

Soapstone	56	parts.
Bone black	8	„
Yellow soap	6	„
Gum arabic	3	„
Glycerin	1	part. s

Dissolve gum in water, add glycerin, mix in pigments; grind to a smooth paste with water and mould.

STAMPING INK

Aniline dye (spirit soluble)	3	parts.
Glycerin	5	„
Methylated spirit	1	part

Mix thoroughly in water bath at 100°F to 130°F. Allow to cool. Then bottle.

INSECT EXTERMINATOR

Kerosene oil, refined	1	gal.
Pyrethrum powder	½	lb.
Para dichlor benzene	1	„
Perfume	Sufficient.	

Mix.

GLASSINE PAPER

Paper coated with or dipped in the following solution and then hung up to dry.

Gum copal	10	oz.
Alcohol	30	fl.oz.
Castor oil	10	oz.

Dissolve by letting stand overnight in a covered jar and stirring the next day.

ANILINE MARKING INK

Aniline hydrochloride	1	oz.
Copper sulphate	5	dr.
Dextrin	2½	„
Glycerin	2	„

Mix and then add sufficient distilled water to form a thin paste.

In the Field of Invention

PHOTO-TYPESETTING MACHINE.

At the recently opened Laboratories of the Printing Research Association at Leatherhead, Surrey, equipment has been installed to demonstrate a system of photo-typesetting which dispenses with cast metal type. Its trade name is "Rotofoto".

The new method is a purely photographic process which should be useful in printing type by the lithography and gravure processes now widely used in the production of books and periodicals. The new system appears to be as cheap as standard printing practice; and it has the obvious advantage that the photographic master-copy of a book's type-script, from which reprints can be made, can be stored in a small space.

The "Rotofoto" equipment comprises a Monotype keyboard, a line-projector, and a make-up machine for producing paper proofs and film transparencies. A punched paper record, representing the "copy", is first made by a Monotype keyboard operator. This paper record is transferred to the line-projector which contains the mechanism of the Monotype composition caster with the main difference that a photographic negative takes the place of the matrixes.

The letters punched in the record are photographed on a roll of 35 mm. cinematograph film carried in a camera under the type negative. After a full line has been completed the film is advanced, the distance depending on the space required between the lines, and the next line is photographed. The line-projector operates at about the same speed as a Monotype casting machine

Readers' and authors' corrections are dealt with separately and contained in other rolls of films; the make-up machine operator introduces the corrected lines during the process of making a perfect photographic transparency of the type matter.

The operations are simple and rapid and produce transparencies of high fidelity. Any type-face can be employed by using the appropriate negative, the type sizes can be controlled by the magnification employed in the make-up machine. At present 3 negatives are used to cover the complete range of composition sizes.

—JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH.

ELECTRONIC HEATER.

An electronic heater by the Industrial Heating Division, General Electric Co., Schenectady, N.Y., permits exact duplication of hardening results on a series of steel parts. After the part is placed in this fixture and the start button pressed, an automatically controlled heating cycle is produced; for annealing, brazing, or soldering. By simply exchanging the induction coil, the same instrument can be adapted for use on different heating jobs.

PROPANE TORCHES FOR DRYING MOULDING SAND.

Propane instead of oil torches are now employed for drying green sand moulds in foundries. In large foundries the propane is stored in tanks and supplied to the torches through ½ inch hose, the smaller foundries keep the fuel in 200 lb. cylinders regulated to hold the pressure and air pressure of 90-100 lbs., the propane gas is fed to the torches and lighted with a match. When the mould is heated up, the air supply is increased to produce a blue flame, and drying is completed to the suitable depth. This process accelerates the drying process; the mould becomes particularly hard and clean.

HEATLESS DEHYDRATION

An entirely new process for dehydrating fruits and vegetables has been developed at the research department of th Sun-Maid Raisin Growers Association of Fresno, Cal. Dehydration is achieved by a stream of air blown over the material at high velocity, but at normal temperature. Drying of grapes with the new method takes only ⅓ to ½ of the time required by the ordinary process and the drying of corn and string beans is also accelerated. The higher the velocity of the air current, the shorter is the drying period required.

SYNTHETIC SOLE.

A new synthetic for use in shoe soles, Neolite, by the Goodyear Tire & Rubber Co., Akron, Ohio, is reported to have all the qualities of leather combined with superior wear and uniformity, and to provide better insulation against heat, cold, and moisture. Neolite, which is neither rubber nor fabric or plastic, has the thickness and weight of ordinary leather soles; it is easy to attach by cementing or stitching.

WRINKLEPROOF CLOTH.

A plastic resin-based finish that holds shrinkage below two per cent. and makes cotton textiles resistant against wrinkling has been developed in the United States. The finish can be applied to all types of cotton textiles. Chambrays, prints, Sur-suckers, cords, twills, drills, denisus, corduroys and coverts can be terated with the new finish at small cost. No special equipment is needed for the process.

Formulas, Processes & Answers

LEMON DROPS.

1879 G.G.M., Lucknow—Desires to have a good formula of lemon drops.

Tartaric acid	1	oz.
Sugar	2	lbs.
Essence of lemon	1	dr.

Dissolve the tartaric acid in a very little water and keep ready. Now reduce the sugar into coarse powder and moisten it with a small amount of water. Stir the mixture with a paddle. When it is found to fall off the paddle, it may be considered sufficiently moistened and no more water should be added over it.

Now put this moist sugar in a copper pan and apply heat. Stir all the times until the sugar is completely melted. Next mix 1 lb. of glucose and continue boiling. When the syrup is boiling, this is removed from the fire and tested. If it is found to be too thin, a little more powdered sugar is added and the whole is stirred ontil it is of such a consistency as to run without spreading too much. Next mix the tartaric acid and essence of lemon. While still warm the whole mass is made into a number of suitable lumps and well kneaded to make the colour quite uniform. Each of the plastic lumps is then drawn out into a thick thread and a suitable length is cut out of this with a pair of scissors. The length is then made quite circular by rolling in a table slightly oiled. It is then cut into small pills of uniform size, and rolled them on the table with the palm to give them spherical shape.

REFINING COCONUT OIL.

1899 J.K., Nagpur—Desires to know a process of refining coconut oil.

Coconut oil of inferior quality may be greatly improved by being boiled with about 1 by 30th. of its weight soda lye (sp. gr. 1.03) for half an hour with frequent skimming. Some 4 or 5 lbs. of salt per ton of oil are then added, and the boiling continued for another half hour. Another equal quantity of salt is then added, and the whole boiled up; and after standing till next day, the cleansed oil is run off from the brine and foots that have subsided.

DEODORISING COCONUT OIL.

1987 N.U.S., Kuala Lumpur—Wants to know the commercial processes of deodorising coconut oil.

The methods employed for removing the odour of commercial coconut oil are: (1) Washing out the odoriferous bodies with alcohol, (2) the volatilisation of these bodies by heat. The first method, known as Chevreul's, is conducted in an apparatus which keeps the oil melted and circulates the hot spirit; at the same time evaporaion of the alcohol is prevented. The heating process consists of blowing steam at a pressure of 6 to 8 atmospheres through the melted oil for about two hours to drive off the volatile acids, and 0.25 per cent. of calcined magnesia is added to combine with the non-volatile acids, the magnesium soap being skimmed off the surface.

BOTTLE-CAPPING SOLUTION.

1990 N.K.C.A.P., Mysore—Wishes to have a recipe of bottle-capping solution.

Waste Celluloid Films	300	gr.
Acetone	3	oz.
Benzene	1	oz.
Amyl Acetate	2½	oz.
Aniline Colour, Spirit soluble		q. s.

Cut the celluloid into small pieces and put into a bottle. Then pour the other ingredients and a few grams of dye and lightly close the bottle and keep aside for a day. Shake occasionally.

FIRE BRICKS.

1992 P.K.S., Calcutta—Wants to know the method of making fire bricks.

The raw materials used in the manufacture of fire bricks are usually too hard to be sent direct from the mine to the pug mill.

The ingredients are crushed or ground before being made into a paste. It is possible to use crushing rolls, but as fire clays are obtained in a rock rather than in a plastic state they are best crushed in an edge-runner mill, and, after sifting are mixed with water in a pug mill until a uniform paste is obtained of a consistency suitable for moulding. It is not advisable to mould it immediately but to keep it for several days—for a month in a moist state and then pass it a second time through the pug mill. The reason for this is the souring or putrefaction, which most clays undergo when kept in a moist state, whereby the water is more fully distributed and a more homogeneous paste is the result. The "soured" or "matured" and repugged material is then slop-moulded and then the bricks are dried on a hot floor and afterwards burned as usual.

SNUFF.

1943 D.W.J., Kolhapur—Wants to have a process of making snuff.

Remove the stalks and ribs of Guntur tobacco and bake on a moderate fire till the leaves on pounding give a chocolate colour. Pound the leaves as soon as the baking is finished. Now mix with small quantity of lime and macerate with cow ghee in a stone mortar and

pestle. Finally add suitable compound scents usually sold in the market as Parimal snuff scents.

DEPILATORY POWDER.

2004 M.C., Delhi—Wishes to have a recipe of depilatory powder and also depilatory soap.

Barium sulphide (yellow)	20	grams.
Soap powder	5	"
Talc. powdered	32	"
Wheat flour	32	"

Benzaldehyde, enough to perfume.

DEPILATORY SOAP.

Coconut oil	907	grains.
Caustic Potash lye 33 p.c.	1915	"
Castor oil	1844	"
Glycerine	453	"
Starch	113	"
Sodium sulphide	907	"
Citronella	2	dr.

Put the castor and coconut oils in an iron pan over a moderate fire. Then pour the glycerine. Apply heat and when the temperature is nearly 100°C slowly stir in the caustic potash lye. Continue heating and stirring until the whole of the mixure is saponified. Add water if required. When the soap has been prepared, remove the pan from the fire and incorporate the starch, and the other two ingredients. Allow the mass to cool and then cast into cakes of usual size.

DISINFECTING FLUID.

2005 S.H.H., Lashkar—Desires to have a good formula of preparing disinfecting fluid.

Rosin	85	lbs.
Castor oil 2nd quality	20	"
Caustic soda lye 30°Be	60	"
Light creosote oil	100	"

Melt the rosin, add the castor oil and when still warm add the caustic soda lye and boil thoroughly incorporated and boil the mixture till the whole is saponified. Add a quantity of water from time to time if required. Lastly dissolve the soap thus formed with 3 to 4 times its volume of water and allow to cool.

When nearly cold add the creosote and stir. This gives the disinfecting fluid of good quality.

The object of using castor oil is to give whiteness to the fluid when mixed with water; the product otherwise should be brown. A mixture of caustic soda and potash is also used as an easier mixing product. Naphthalene in cresol and other coal-tar basis for disinfectants are the most frequent cause of this insolubility. A good way to get rid of it is to allow the fluid to stand for about three months during which the naphthalene crystallises out, and the fluid should be decanted from it.

BAR SOAP.

2006 R.C.C., Jaora—Desires to know the method of making bar soap and also sugar tablets.

Tallow	1	md.
Rosin	24	seers.
Sodium silicate	10	"
Caustic soda	10½	"
Water	23½	"

First melt the rosin with all or part of the fat in an iron pan over moderate fire. When the mixture is at 150°F add the lye made with caustic soda and water which should be of 36°Be and stir continuously. Arrange the fire so that the temperature remains steady thereabout. After the mass has been mixed for half an hour, the soap will at first thicken, then grain; and it may again become thick before it becomes smooth. When the mass is perfectly smooth and homogeneous, drop into a frame and crutch in the frame by hand to prevent streaking. After standing for the required length of time the soaps may be moulded or stamped as desired.

SUGAR TABLET.

Cane sugar	10	oz.
Milk sugar	10	"
Moistening agent, water	2	"

Make the mass and granulate in a granulating machine. Then compress into tablets or blocks.

INJECTION MOULDING POWDER.

2015 J.D., Bombay—Wishes to have a recipe of injection moulding powder.

The powder is made up by grinding a mixture of shellac, jute waste, urea and the desired colour or pigment in a Cristy-Norris disintegrator. The powder is fed into the hopper of the moulding machine and should be stirred up very few minutes, since due to its light weight, it does not gravitate automatically unless it is granulated by previous fusion. The temperature of the heating chamber should be maintained at 100°-120°C and the pressure of air at 20-30 atmospheres. The mould temperature should be about 30°C. and the cross-head of the machine below the hopper should be kept cold by water-circulation. After a few impression have been taken, the mould temperature tends

to go up and at this stage the mould members have also to be kept cool by water-circulation. The articles, containing as they do a fibrous filler, are not uniformly glossy, and may be polished lightly on a buffing wheel or sprayed with a lacquer to improve their appearance. For increasing their heat-resistance, the polished or lacquered mouldings are allowed to heat-cure at 40°C. for 24 hours and then at gradually increasing temperatures up to 400°C.

LAMPBLACK.

202 B.D., Kanpur—Desires to learn the modern process of making lampblack.

The last oil obtained in the distillation of coal tar, and freed from naphthalene as far as possible, viz., soot oil, is burned in a special furnace for the production of various grades of lampblack. In this furnace is an iron plate, which must always be kept glowing; upon this plate the soot oil trickles through a small tube fixed above it. It is decomposed and the smoke (soot) rises into four chambers through small apertures. When the quantity of oil destined for decomposition has been used up, the furnace is allowed to stand undisturbed for a few days, and only after this time has elapsed are the chambers opened by windows provided for that purpose. In the fourth chamber is the very finest lampblack, which the lithographers use, and in the third the fine grade employed by manufacturers of printers' ink, while the first and second contain the coarser soot, which, well sifted, is solid as flame lampblack.

From grade No. 1 the calcined lampblack for paper makers is also produced. For preparing this black capsules of iron plate with closing lid are filled, the stuff is stamped firmly into them and the cover smeared up with fine loam. The capsules are next placed in a well-drawing stove and calcined, whereby the empyreumatic oils evaporate and the remaining lampblack becomes odorless. Allow the capsules to cool for a few days before opening them, as the soot dries very slowly, and easily ignites again as soon as air is admitted if the capsules are opened before. This is semi-calcined lampblack.

For the purpose of preparing completely calcined lampblack, the semi-calcined article is again jammed into fresh capsules, closing them up well and calcining thoroughly once more. After 2 days the capsules are opened containing the all-calcined lampblack in compact pieces.

For the manufacture of coal soot another furnace is employed. Asphalt or pitch is burned in it with exclusion of air as far as practicable. It is thrown in through the doors, and the smoke escapes through the chimney to the soot chambers, 1, 2, 3, 4, and 5, assorting itself there.

When the amount of asphalt pitch destined for combustion has burned up completely, the furnace is left alone for several days without opening it. After this time has elapsed the outside doors are slowly opened and some air is admitted. Later on they can be opened altogether after one is satisfied that the soot has cooled completely. Chamber 4 contains the finest soot black, destined for the manufacture of leather cloth and oil cloth. In the other chambers is fine and ordinary flame black, which is sifted and packed in suitable barrels. Calcined lampblack may also be produced from it, the operation being the same as for oil black.

PLASTER OF PARIS.

2032 D.L.P.S., Jodhpur—Wants to have a process of manufacturing plaster of paris on a small scale.

In preparing plaster of Paris on a small scale, the finely ground gypsum is spread over a shallow metal dish in a layer of 2-3 inches in thickness, and heated over a coke fire. At about 100-110°C. the surface will rise up bodily due to the pressure of steam from the lower layers which ultimately force its way by piercing the surface at several points. Stirring is continued from time to time till the evolution of steam ceases as will be evident by holding a cold metal surface above. Care should be taken to prevent over-heating and when no further evolution of steam takes place, heat is withdrawn and the plaster is ready for use.

Another process of making plaster of Paris is as follows:—

Small lumps of gypsum are introduced in a well-heated oven very similar to that used in bakery. The temperature of the oven be such that a hand stretched inside will be able to bear it for a few seconds. The oven is closed when fully charged and the stones baked for 12 to 20 hours, during which samples are taken out from time to time to ascertain the degree of dehydration. The burning is considered to be complete when the stone exhibits on the white fractured surface only a few bright specks here and there of crystalline particles not completely deprived of the water of hydration. The stones are then allowed to cool before they are ready for grinding.

BENZYL ACETATE.

2052 P.C.C., Benares—Wishes to have a process of preparing benzyl acetate.

Benzil acetate or oil of jasmine can be prepared with a mixture of 109 c.c. of benzyl alcohol (obtained by the action of potassium hydroxide on benzaldehyde and subsequent distillation), 60.5 c.c. of glacial acetic acid, and 10 c.c. of concentrated sulphuric acid placed in a distilling flask of sufficient capacity and heated to the boiling point. At about 215°C., a sweet smelling oil will distill over and collect in the receiving flask. This oil is a natural constituent of oil of jasmine, Ylangylang, and other flower oils.

NEEM SOAP BY COLD PROCESS.

2058 P.S.C., Pali Marwar—Wants to know a formula of preparing neem soap.

Coconut oil	17½ lbs.
Neem oil	2½ „
Caustic soda lye 36°Be	10 „
Ceramine yellow	2 grain.
Soap blue	1 „

Slightly warm the coconut oil and mix with the neem oil. Remove from the fire and slowly with stirring add the caustic lye. After adding the caustic mix the dye dissolved in a little water. Now go on stirring until the mass begins to thicken. At this stage pour the soap into frames. Cover the whole with a blanket and aside for 24 hours when the soap will be finished. Keep the soap thus obtained for 6 or 7 days and then taken out of the frame cut into blocks and stamped.

EAU-DE-COLOGNE.

2123 G.M., Colombo—Wants to have a good formula of preparing eau-de-cologne.

Bergamot oil	1 oz.
Lemon oil	½ „
Rosemary oil	2 dr.
Neroli oil	30 mins.
Lavender oil	4 dr.
Orange oil	2 „
Rectified spirit	2 lbs.

Mix the ingredients one by one with brisk shaking. Set the whole aside in a stoppered vessel for fortnight. During this period shake the vessel thrice daily. Finally filter and pack.

FOUNTAIN PEN INK.

2130 V.T.S.K., Coimbatore—Wishes to have a formula of preparing blue fountain pen ink.

Induline or Soluble Blue	4 parts.
Distilled water	320 „

Dissolve and mix a little rectified spirit and bottle. The proportion of water may be suitably changed to arrive at the desired depth of colour.

MAGIC SERPENT.

2155 A.P., Calcutta—Wants to have a good recipe of magic serpent.

This remarkable substance consists of small pellets of sulphocyanide of mercury which has the remarkable property of swelling 25 to 50 times its original size when lighted, producing a long snake-like ash. To prepare, make a concentrated solution of mercuric chloride and add little by little a solution of potassium sulphocyanide, stirring constantly. A greyish precipitate will be formed and when the last drop of sulphocyanide added no longer produces cloudiness permit the mixture to settle. Drain off as much as possible of the clear supernatant liquid, remove precipitate to a paper filter placed in a glass funnel and wash slightly. When thoroughly dry reduce to a fine powder. Now moisten very sparingly with a weak solution of gum arabic to which may be added a pinch of saltpetre and form into cones.

SOLID BLOCK DISINFECTANT.

2226 A.S.B., Allahabad—Wants to know a formula of preparing solid block disinfectant.

Tallow	44 parts.
Caustic soda lye (40 Tw)	30 „
Soda ash	16 „
Light creosote oil	8 „
Water	Sufficient to dissolve the soda ash.

Put the tallow in a capacious pan placed over an oven. When the tallow is liquefied, slowly mix the caustic soda lye, with stirring. Boil the mixture until totally saponified. Then put down the fire and allow the mass to cool a little. Next mix the light creosote oil and finally the soda ash solution. Pour the mixture in a frame and set aside for a day. Then the solid mass is taken out and cut into small cubes.

SYNTHETIC INDIGO.

2217 C.J.P., Unjha—Wishes to be enlightened with the process of preparing synthetic indigo.

To prepare indigo heat aniline with chloracetic acid of equal proportion for 1 to 2 hours whereby phenylglycine is obtained. This is then fused with sodamide (prepared by heating metallic sodium in a strain of dry ammonia gas) when the phenylglycine is converted into indoxyl with the evolution of ammonia gas, which should be collected and used again. To obtain indigo the indoxyl still in the fused state is dissolved in water, and air blown through to oxidise and condense the indoxyl to indigo; or the solution is acidified so as to give free indoxyl, which is then oxidised and condensed to indigo.

BOTTLE CAPPING COMPOUND

2297 H.V., Kanauj—Desires to know a good recipe of bottle capping compound.

Gelatin	1 oz.
Gum arabic	1 „
Boric acid	20 gr.
Water	16 fl. oz.
Starch	2 oz.

Mix the gelatin, gum arabic, and boric acid with 14 fl. oz. of cold water, stir occasionally until the gum is dissolved, heat the mixture to boiling, remove the scum, and strain. Also mix the starch intimately with the remainder of the water, and stir this mixture into the hot gelatin mixture into the hot gelatin mixture until a uniform product results. As desired, the composition may be tinted with any suitable dye. Before using, it must be softened by the application of heat.

Brief Queries and Replies

Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge in serial order. Questions are replied by post on receipt of As. 8 stamps for each question. Subscribers outside India are requested to send two International Reply coupons for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.

315 M. N. M., Khathauli—Process of curing gut will appear in due course. Process of manufacturing gut will be found in Utiliation of Common Products published from this office. price Rs. Rs. 3/7/- including postage.

316 P. V. R. R., Eklaspuram—Refer your query to the Industries Department of your province.

317 H. T. C., Mangalore—Process of manufacturing toffee will appear in due course. Toffee making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

318 S.A.P., Trichy—Process of printing leather soles in golden colour will appear in due course.

330 W.C.J., Quilon—For printing ink enquire of Ganges Printing Ink Factory Ltd., 9, Netaji Subhas Road, Calcutta and Hooghly Ink Co. Ltd., 433, Grand Trunk Road, Howrah.

331 V.S., Chitoor—For labels enquire of Paul & Co., 100/2, Grey Street, Calcutta and Mukherjee & Sons, 3, Ezra Street, Calcutta.

332 M.R.C., Konnagar—You have to invest at least Rs. 50,000/- for starting a hosiery factory. For machines enquire of W. H. Brady & Co., Ltd., Mercantile Bldgs., Lall Bazar, Calcutta.

333 A.K.A., Rampur State—Process of manufacturing rubber stamp will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage. For rubber stamp making equipment enquire of B. Goray & Co., 156, Cornwallis Street, Calcutta.

334 S.A.M., Poona—Process of fruit drying will be found in All About Fruits published from this office, price Rs. 5/-.

335 C.P., Nautanwa—We have no book on brick and tile manufacture. For the book enquire of Thacker Spink & Co., (1933). Ltd., 3, Esplanade East and W. Newman & Co., Ltd., 3, Old Court House Street; both of Calcutta.

336 E.R.S., Berhampur—For automatic photographic equipment enquire of Photographic Stores & Agency Co., Ltd., 154, Dharamtala Street, Calcutta.

337 T. R. B. G., Ithalar — For chemical analysis enquire of R. V. Briggs, 3 & 4, Garstin Place, Calcutta.

338 W.C.R.S., Tinsukia—For a catalogue of furniture enquire of C. Lazarus & Co., Ltd., 117, Park Street; Modern Furnishers, 11, Park Street and N. N. Bose & Co., Ltd., 53D, Wellesley Place; all of Calcutta. For mirrors enquire of Deb K. Law & Co., 7, Swallow Lane and Fotic Lal Seal & Sons, 10, Swallow Lane; both of Calcutta.

339 S.L., Ludhiana—Process of manufacturing gelatine duplicator oil will appear in due course.

345 S.W.D.C., New Delhi—For filter powder you may enquire of Allied Agency, 16, Bonfield Lane, Calcutta.

348 S.B.S.S., Ludhiana—For wirenail making machines enquire of Oriental Machinery Supplying Agency Ltd., P.12, Mission Row Extension, Calcutta.

353 J.S., Allahabad—For type foundry machine enquire of John Dickinson & Co., 6, Clive Row, Calcutta.

354 P.S.B., Delhi—We have no book dealing with wheat and corn flake manufacture. For machines you may enquire of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta.

355 S.D., Nilgiris—We cannot say what has been used as emulsifying in Brylcreem. It is very difficult to suggest formula of proprietory articles.

357 M.A.R., Dehra Dun — Process of manufacturing emulsion of wax and vegetable oil in water will appear in due course.

359 R.K.C., Delhi—With Rs. 500/- as initial capital you may start manufacture of ink, surti, etc.

360 G.P.S., Chaibassa—Process of manufacturing taral alta and nail polish will be found in Indian Perfumes, Essences and Hair Oils published from this office, price Rs. 3/7/- including postage.

361 I.T.C., Chittagong—For plywood making machine enquire of Standard Machinery Co., 86B, Netaji Subhas Road, Calcutta.

362 A.S., Feroke—Process of manufacturing lead pencil will appear in due course. For starting a lead pencil factory you have to invest Rs. 40,000/-. As regards raw materials graphite and soft wood of straight veins should be required. Deodar is used for some kinds of pencils. You willl require crushing roller, grooving machine and wood-working machines.

366 M.C.M.C., Calcutta—For electric wire enquire of National Insulated Cable Co. of India Ltd., Stephen House, Dalhousie Square and British Insulated Cables Ltd., B1, Cable House, Hare Street; both of Calcutta.

368 M.A.S.O., Berhampur—Following is a list of chemical examiners:—J. & R. Hutchison, 19, Dum Dum Road and R. V. Briggs & Co., Ltd., 3 & 4, Garstin Place; both of Calcutta.

369 M.L.B., Delhi—For solid tyres enquire of R. B. S. Jain Rubber Mills, Lilooah, Howrah and Dunlop Rubber Co. (India) Ltd., Sahaganj, Hooghly.

370 M.L.K., Jwalapur—For making ropes out of bhaber and munj grass special kind of machine is required. But this machine is not available at present. Ordinary lacquer will serve the purpose of dyeing articles of above grass.

371 B.D.C., Calcutta—Wants to be put in touch with the manufacturers of "Bharat" and "Atlas" rubber stamp pads.

372 S.B.S., Kanpur—Hair clip and hair pin making machines may be had of Baird Machinery Co., Bridgeport, Connecticut, U.S.A., For wire enquire of Balmer Lawrie & Co. Ltd., 103, Netaji Subhas Road, Calcutta.

373 N.K.C.A.P., Mysore—Process of manufacturing extracts will appear in due course.

375 H.K.R., Tehatta—Address of J. A. Phillips & Co. Ltd., is Smethwick, Birmingham, England.

376 G.T.I., Benares City—For steel strips required enquire of Balmer Lawrie & Co. Ltd., 103, Netaji Subhas Road, Calcutta. Wants to be put in touch with the suppliers of fibres suitable for making brooms.

377 M.A., Nagina—You have to use cream separator and churner for making butter and evaporated milk. For the above machines enquire of Edward Keventer Ltd., 11/3, Lindsay Street, Calcutta.

379 S.B., Khuban — You may consult Industry Year Book and Directory published from this office, price Rs. 12/-, postage extra.

380 V.S.C., Madras—Please refer your difficulty when we shall try to solve your difficulty.

382 S.J.S., Ranchi—For aluminium wares enquire of Aluminium Corporation of India Ltd., 9, Clive Street; Indian Aluminium Co. Ltd., 5, Council House Street and Jeewanlal (1929), Ltd., 101, Netaji Subhas Road; all of Calcutta.

385 I.R.S., Banares City—Following is a formula of chalk crayons: Precipitated chalk 8 oz; China clay 5½ oz; Oleic acid 6½ oz; Caustic soda 1 oz; water q. s. Mix the oleic acid and caustic soda, after warming them separately. Then add to the clay and chalk mixed with enough water to bring to about the consistency of puthy. The mixing must be done in a standard type dough mixer or other clay mixing equipment. Then cast into sticks of the usual size and bake over moderate heat. Following is a formula of slate pencil: Powdered slate 60 parts; powdered limestone 30 parts; Sodium silicate 10 parts. Knead together all the ingredients to form a plastic mass and then force it through metallic tubes of suitable diameter filled with pistons. Afterwards cut off into small lengths and bake over a slow fire.

386 P.R.R., Coringa—For advertising tape enquire of Eagle Advertising Tape Factory, 51, Eaglewadi, Kurla, Bombay and R. G. Paul & Co., 110/2, Grey Street, Calcutta.

387 K. S. T., Rameswaram — Process of separating gold from soil will appear in due course in Formulas Section.

388 H.P., Madras—For melting rubber you have to engage an expert. For expert advertise in newspaper.

389 S.L.T.C., Bombay — For addresses of Japanese firms enquire of Indo Commercial Co., Oomrigarh Bldg., Bombay 3. For transfer labels enquire of Signograph Co., Baranagar.

390 S.M.C.L., Bankura—Refer your query to the Director of Industries, West Bengal Government, 7, Council House Street, Calcutta.

397 H.W.C., Colombo—Process of distilling alcohol will appear in Formulas Processes and Answers Section.

398 G.A., Amritsar—We have no book dealing with the manufacture of hydraulic brake oil. Following is a recipe of hydraulic brake oil: Hydro acetyl acetone 4 oz; Refined castor oil 6 oz. Mix thoroughly.

399 P.V.V., Travancore—As far as we know dyes are not manufactured from tea waste and pluffs.

402 S.K.N., Ahmedabad—Plaster of Paris is obtained by calcining gypsum at 100°C. It is used for structural purposes, in the manufacture of vases and for making cast of objects. For plaster of paris enquire of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. The stiff hairs of swine are known as bristles. They are commonly stiffened by immersion for a short time in alum-water and are dyed by steeping them for a short time in any of the common dyes used for cotton or wool. Process of manufacturing fire works will be found in Home Industries, published from this office, price Rs. 3/7/- including postage.

403 C.M.J.S., Trichur—For binding gum enquire of Golam Akbar Khan & Co., 72, Baitakkhana Road, Calcutta; B. C. Patel & Co., Sai Bhuwan, 143, Princess Street, Bombay 2 and Nooroodin Abdulhusein, 66, Sutar Chawl, Bombay 2.

404 K.S.T., Rameswaram — Process of separating garrnet sand will appear n Formula section in due course.

405 Y.N.K., New Delhi—We are not aware of any such institute.

408 S.A.M., Patna—You may start candle manufacture with Rs. 5000/-. An article on candle manufacture appears elsewhere in this issue. Candle making machine may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta 4.

410 M.M.C., Kathankudy—For herbs and drugs enquire of Banshidhar Dutt, 126, Khengrapatty Street, Barabazar, Calcutta. Machines may be had of Prabartak Commercial Corporation, 61, Bowbazar Street, Calcutta. Bottles may be had of Ananta Kumar Ghose & Co., 9, Ezra Street, Calcutta.

411 B.V.D., Indore City—For dyes enquire of Imperial Chemical Industries (India), Ltd., 18, Strand Road, Calcutta; Ciba (India), Ltd., Jehangir Bldg., Esplanade Road, Fort, Bombay and East India Colour Co., 34, Armenian Street, Calcutta.

412 T.S.V., Muzaffarpur—Refer your query to the Registrar, Joint Stock Companies, 29, Mission Row Extension, Calcutta.

413 N.B.D., Calcutta—You may consult Technology and Manufacture of Printing Ink published from this office. But printing ink manufacture cannot be started with small capital.

415 K.S.A.,—Calcutta—For plastic goods enquire of B. M. Singh & Son, 1, Crooked Lane, Calcutta; Utility Products Ltd., 14, Bentinck Street, Calcutta; Plastics Products Ltd., Cawnpore and Swadeshi Industries Ltd., Jaipuria House, 132, Vivekananda Road, Calcutta. An article on plastic manufacture appeared in December 1948, issue of Industry.

416 K.B., Jamnagar—See under No. 415 above.

417 R.C.J., Jaipur — For oil expeller enquire of Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, Calcutta.

423 S.P., Delhi—Formula of insulating sealing compound will appear in Formula section in due course.

424 K. K. D. S., Puri — For iron safes enquire of Bengal Iron Safe and Lock Works, 120, Sova Bazar Street; G. Ray & Co., 70/1, Netaji Subhas Road and Roy & Co., 100, Harrison Road; all of Calcutta.

427 K.E.W., Benares Cantt—Process of insulating copper wire and manufacturing varnish will appear in formula section in due course.

429 P.L.S., Agra—Process of manufacturing boot polish will appear in Formula section in due course.

430 J.M.C., Dindigul—Process of manufacturing ointment will appear in Formula section in due course.

432 S.C.D., Gwalior—Process of manufacturing bone meal will be found in Utilisation of Common Products, published from this office, price Rs. 3/7/- including postage. For machines you may enquire of Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, Calcutta.

433 B.B., Burdwan—As far as we know phenol formaldehyde resin is not manufactured in India. You may however enquire of Alfred Herbert (India), Ltd., 13/3, Strand Road, Calcutta for raw materials required for plastic Industry.

434 G.S.P., Champaran—Wants to buy a new or secondhand motor truck ½ ton capacity worked by charcoal gas. Sand from river bed may be used in manufacturing pottery.

435 K.P., Muzaffarpur—Wirenail making machine may be had of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta. Other machines are not available in India at present. You may however enquire of Baird Machinery Co., Bridgeport, Connecticut, U.S.A. Tin containers may be had of Bengal Tin Box Mfg. Co., Ltd., 1, Jadu Nath Mitter Lane, Calcutta 4.

437 G.B.B., Berhampur—For saw mill and oil expeller enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta and Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

438 T.A.M.W., Alamuru—An article on colouring aluminium articles appeared in January 1949 issue of Industry which you may consult.

439 E.E., Berhampur—Following is a list of stock and share dealers: Bengal Share Dealers' Syndicate, 12, Chowringhee Square; East India Stocks & Share Dealers Syndicate Ltd., 2, Royal Exchange Place and Investment Exchange, 25C, Swallow Lane; all of Calcutta.

442 P.A.U.P., Srihind—For patent and trade mark registration negotiate with A. Mittra & Co., 5-2F, Raja Rajballav Street, Calcutta and Dutta & Co., 82, Harrison Road, Calcutta.

444 J.C., Madura—For pushing on sale of hair oil you should advertise widely.

485 M.E.W., Meerut City—For books on mechanical engineering and iron foundry en-

quire of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta. For drawing instruments enquire of J. Sur & Co., Dalhousie Square, Calcutta.

447 V.S.T., Rameswaram—Process of separating titanium oxide and ferrous oxide ilmenite will appear in Formula section in due course.

448 R.B.K., Udaipur—We have no book on printing press management. You may however enquire of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East and W. Newman & Co., Ltd., 3, Old Court House Street; both of Calcutta.

449 C.M.P.C., Mehmadabad—Biscuit making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta 4.

450 L.D.P.W., Udaipur—Vernacular equivalent of ingredients are not available.

451 K.C.N., Agra—Following is a formula of sugandhi dhoop· Musk 10 grains; Amber gris 10 grains; Powdered benzoin 1 oz.; Powdered camphor 1 oz.; Powder cascarilla 1 dr.; Powdered nitre 1 dr.; Powdered charcoal 2 oz Mix and make in a thin paste with mucilage of tragacanth, when sticks are made by dipping thin wooden splinters into the emulsion.

455 T.P.S., Madras—For artificial eyes of animals enquire of Manton & Co., Ltd., 13, Old Court House Street, Calcutta and G. Edwards & Co, 67, Dharamtala Street, Calcutta. Process of curing rabbit skins will appear in due course in Formula section.

456 D., Agra—Curry powder may be sold in Africa. Process of printing cloth will be found in Cotton Dyeing and Printing, published from this office, price Rs. 3/7/- including postage.

457 D.K., Bombay—A good formula of office paste will be found in March, 1949, issue of Industry.

458 C.J., Bhavnagar—We are not aware of any process of manufacturing vegetable ghee without machinery.

459 S.A.H., Bhopal—Process of blacking and bluing gun barrels will appear in Formula section in due course.

461 G.T.O., Ujhani—Rubber latex is used for manufacturing rubber baloons. Process will be found in Manufacture of Rubber Goods published from this office, price Rs. 3 7 including postage.

466 A.S., Samalkot—You may add essence vanilin to coffee.

467 N.S., Kakinada—For weights enquire of Nagendra Nath Karmakar, 213, Harrison Road, Calcutta and S. P., Guchait & Sons, 2, Madhusudan Pal Choudhury Lane, Howrah.

469 K.P.S., Motihary—We have no book on glucose manufacture. Glucose is manufacturer from starch.

470 L.E.R.C., Bombay—Wants to be put in touch with England Cutlery Works and Madar Cuelery Works formerly of Wazirabad.

471 N.K.D.R., Karimganj—You may start candle manufacture with Rs. 5,000. Candle making moulds may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. For wax write to Burmah-Shell Oil Storage & Distributing Co., Ltd., Hongkong House, Dalhousie Square, Calcutta. Melt the wax and pour in the mould set with wicks.

473 B.D., Mathura—Laundry machines may be had of Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta.

476 B.P., Anklav—For artificial limbs enquire of Deformity Appliances & Hospital Stores, 3, Bankim Chatterjee Street, Calcutta and Orthopaedic Appliances Stores, 113, Chittaranjan Avenue, Calcutta.

478 B.D.D., Trichinopolli—Sugar industry is profitable no doubt. You require sugar cane for manufacturing sugar from its juice. For machines enquire of Burn & Co., 12, Mission Row, Calcutta; Duncan Stewart & Co. Ltd., W. H. Brady & Co., The Mall, Kanpur; Marshal Sons & Co., Ltd., 99, Netaji Subhas Road Calcutta and Mirrlees Watson Co., Ltd., 28 Grosvenor House, 21, Old Court House Street Calcutta.

482 D.D.C., Bagnan—Process of colouring stone wares will appear in Formula section in due course.

490 R.S., Bareilly—Particulars other than already supplied to you regarding silver leaf manufacture are not available.

491 D.S.V., Tarikere—For tea enquire of B. K. Saha & Bros. Ltd., 5, Pollock Street Darjeeling Tea Trading Co., 42-B, Strand Road; Excel Tea Co., 38, Strand Road, and Imperial Tea Co., 4, Raja Woodmunt Street, all of Calcutta.

492 I.M., Dhanbad—First treat the oil with animal charcoal, then pass steam under atmosphere pressure.

493 R.R.S., Gwalior—Oil soluble dyes may be had of Bharat Chemicals Co., 331, Samuel Street, Vadgadi, Bombay; Dolatram Kashiram & Co, Khan Mohamed Kashiram Bldg., Thakurdwar, Road, Bombay 2 and National Aniline & Chemical Co., Patel House, Church Gate Street Fort, Bombay.

498 J.C.M.C., Hyderabad—Special kind of machine is required for making washers. These are made from leather and not rubber.

499 R.C.P., Hoshiarpur—Formulas of non alcoholic essences will appear in Formula section in due course.

502 N.P., Gudiyattam—A formula of disinfectant fluid appeared in March, 1949, issue of Industry.

503 Y.C.K., Bellary—You should use nitric acid for engraving brass.

504 B.S., Delhi—Process of manufacturing bansalochan and ultramarine blue will appear in Formula section in due course.

508 A.M., Peshawar—Process of galvanising small articles will appear in Formula section in due course.

511 J.S., Hissar—For ice cream making machine enquire of Refrigerators (India) Ltd., 59C, Park Street, Calcutta and British Refrigerators, 30A, Chowringhee, Calcutta. For laughing glasses enquire of Behary Lal Dey, 9, Swallow Lane and Deb K. Law & Co., 7, Swallow Lane; both of Calcutta.

512 S.N.G., Bombay—We have no book on artificial gem manufacture. You may enquire of W. Newman & Co., Ltd., 3, Old Court House Street, Calcutta. Artificial stones are manufactured by Gem House, Jaipur. Process of manufacturing artificial stone will appear in Formula section in due course.

513 A.S.G., Jagadhri—Following is a formula of ice cream powder:—Milk powder 24 oz; Powdered sugar 24 oz; Arrowroot 8 oz; Gelatin, powdered 2 oz; Vanilin sugar (1:50) 2 oz. Mix and divide into packets of 4 oz. sufficient for one pint of milk or a mixture of milk and water.

514 T.K.S.N., Negapatam—Formulas of fire works, pachakarpoor, etc. will appear in Formula section in due course.

520 M.S.F., Siliguri—If you put rosin in iron pan and put over fire it will melt by itself you need not add water. Creosote oil is also known as tar oil obtained by distilling coaltar.

521 B.C.W., Vartej—Tin cans may be had of Bengal Tin Box Mfg. Co., Ltd., 1, Jadunath Mitter Lane, Calcutta; Ganga Tin Factory, 5, Raja Rajkissen Street, Calcutta; Habib Dada & Co., 63, Dontad Street, Mandvi, Bombay and N. A. G. Tin Factory, Gaffer Bldg.. King Edward Road, Sewree, Bombay.

526 M.S.A.S., Rangoon—For preserving syrup you may add benzoic acid or sodium metabisulphite. Formulas of aerated water will appear in Formula section in due course.

529 K.N.M., Hyderabad—Process of manufacturing sand paper will be found in March, 1949, issue of Industry.

531 T.B.C., Dehra Dun—Calcium carbide is not manufactured in India at present.

534 M.S., Srirangam—You may start a glass factory with Rs. 1 lakh. We have no book on glass manufacture. For machines enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

535, P.C., Andersonpet—Brush making machines are not available at present. You may however negotiate with Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta. We have no book on brush making.

536 C.I., Bezwada—For required paper and gelatin solution enquire of Photographic Stores and Agency Co., Ltd., 154, Dharamtala Street, Calcutta.

538 I.E., Agra—Wants to be put in touch with dry cleaners and laundries of U.P., C.P. and Madras.

539 A.L.C., Kanpur—Further particulars of stainless steel paint are not available. This is in experimental stage and is not available in the market.

540 R.E.C., Chittagong—Cardboard box making machines may be had of John Dickinson & Co., 6, Clive Row, Calcutta and Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

541 J.M.S., Jamnagar—We have no book on wool industry and dairy farming. You may however enquire of Thacker Spink & Co. (1933) Ltd., 3, Esplanade East and W. Newman & Co., Ltd., 3, Old Court House Street; both of Calcutta.

543 P.T.S.C., Imphal—For cardamom you may enquire of Ram Chandra Parshottamdas, 22, Amratala Street and Banshidhar Dutt, 126, Khengrapatty Street; both of Calcutta. Other addresses you require are not available.

544 D.A.C., Ahmedabad—For turpentine oil enquire of the following firms: Bhagwandas Sud & Sons, 11, Bank Street, Fort, Bombay; Chattarbukganj Turpentine Factory, Bareilly and India Turpentine & Rosin Co., Ltd., Civil Lines, Cawnpore.

547 N.R.T., Masulipatam—Following is a list of baloon manufacturers: Baichu Rubber Industry, Itwari Stn., Nagpur; Bombay Rubber Co., 428, Kalbadevi Road, Bombay and Oriental Rubber Industries, Wardha, C.P. Glass bangles may be had of S. C. Karanjia & Co., Bazar Gate Street, Fort, Bombay and Sha Rikabchand Amin Chand & Co., Bazar Gate, Bombay.

549 V.A.K., Mangalore—Process of block making will appear in Formula section in due course.

550 R.L.M., Dharamsala—You may consult Indian Tobacco and Its Preparations published from this office, price Rs. 3/7/- including postage. Cigarette making machines are not available in India. You may however negotiate with Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta and Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. For starting a cigarette factory you have to invest Rs. 1 lakh.

551 B.S.C., Ludhiana—For cinema spare parts enquire of the following firms: Britannia Talking Machine Co., 194, Dharamtala Street, Calcutta; International Talkie Equipment Co., 17, New Queen's Road, Bombay 4, and Sound Equipment Service, 69, Harrison Road, Calcutta.

552 R.S.L.S.R.S.R., Muzaffarnagar—For the machine required enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta and International Trading Co., 13, Netaji Subhas Road, Calcutta.

553 N. B., Amritsar — For weighing machines enquire of W. & T. Avery Ltd., Avery House, 28, Waterloo Street, Calcutta and T. E. Thomson & Co., Ltd., 9, Esplanade East, Calcutta.

554 K.E.W., Big Kancheepuram — For machines required for pipes and bolts enquire of Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta.

555 C.A.R., Guntakal—Wire nail making machines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

50 P.C.S., Barh—For watch and watch material enquire of Anglo-Swiss Watch Co., 6 & 7, Dalhousie Square; Hamilton & Co., Ltd., 8, Old Court House St.; all of Calcutta.

561 H.M.A.S., Patna — Candle making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

563 R.S.R., Bangalore City—For selling mirbane and aniline oil you should advertise in Industry. Shellac wax is wax obtained from shellac and is used as a substitute for carnauba wax.

565 H.L.O. Ambala—Bucket making machine may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

566 S.S.S., Indore—For handloom coating, shirting, etc., enquire of Haralalka & Co., 52-1-1, College Street, Calcutta; Calcutta Friends Society Ltd., College Street, Calcutta; East Bengal Society, Ashutosh Bldgs., 87-2, College Street, Calcutta. Silk goods also may be had of the above firms. Wants to be put in touch with the suppliers of canvas jute and waterproof hand bags.

568 V.C., Nawagarh — For ghanies and expeller enquire of Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, Calcutta.

569 Y.C.K., Bellary—Process of manufacturing rubber stamp will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage.

570 B.L., Ajmer—Process of manufacturing pencil will be found in Indusry Prize Article published from this office, price Re. 1/15/- including postage.

573 T.K.M.P., Srirangam—For starting import business you have to secure import licence. For securing import licence you should write to Controller of Imports, New Delhi.

576 Y.S.T., Dewas—To communicate with any querist write him with number and initial care of Industry when your letters will be duly redirected.

578 C.T.B.B., Katmandu — Particulars of sugar refining process is not available. For particulars you may write direct to Dr. Donald F. Othmer at Brooklyn, U. S. A.

579 R.K.S., Dalsingsarai—To communicate with any querist write to him with number and initials care of Industry when your letter will be duly redirected.

581 U.P., Sultanpur—You may consult Electroplating in Practice by M. N. Mitter, published from this office, price Rs. 3-7 including postage. As regards rubber stamp making you may consult Manufacture of Rubber Goods, published from this office, price Rs. 3/7/- including postage.

582 B.M.D., Ghusuri—A good recipe of santonin tablets will be found in July, 1948, issue of Industry.

583 C.B.C., Tatanagar—For brass sheet enquire of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta. For lathe, drilling machines, etc. enquire of T. E. Thomson & Co., Ltd., 9, Esplanade East, Calcutta and Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta.

584 M.I., Tarikere—Process of manufacturing grindinig stone will appear in Formula section in due course.

585 K.M.W., Jagadhri—For the books on agriculture enquire of Thacker Spink & Co., (1933), Ltd., 3. Esplanade East, Calcutta.

587 H.M.K., Surat—For soap training write to the Soap Training Institute, 3, Mangoe Lane, Calcutta.

588 N.T.C., Delhi—You may consult Cotton Dyeing and Printing published from this office, price Rs. 3/7/- including postage.

589 P.M.D., Calcutta—For plastic sheets enquire of Rubako Industries, Behramji Mansion, Sir P. M. Road, Bombay; Popular Plastics, Ruby House, Opp. Colaba Tram Terminus, Bombay 5 and Abdul Kayum Esufally & Bros., 193, Abdul Rehman Street, Bombay 3.

590 S.K.R., Salem—Process of manufacturing coffee powder and tablet will appear in due course.

591 S.N.N., Gumla—Yes, you may import cardboard slates. But before importing you should secure import licence.

594 S.M.D., Ambala Cantt.—Any sort of charcoal will do in manufacturing ultramine blue. In place of crucibles you may use iron retorts.

595 B.K S., Baitala—Process of making caustic lye of different strength will be found in Manufacture of Soap published from this office, price Rs 3-7 including postage.

598 I R., Guntur—Electroplating machines may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

599 S.R.M., Pilibhit—Process of manufacturing solidified spirit will appear in Formula section in due course.

601 B.B, Jagadishpur—Grinding machines may be had of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta and T. E. Thomson & Co, Ltd., 9, Esplanade East, Calcutta.

602 B.R., Bhagalpur—For power looms enquire of W. H. Brady & Co., Ltd., Mercantile Bldg, Lall Bazar, Calcutta.

603 R.K.C., Gwalior—Following is a formula of bottle capping compound Gelatin 1 oz; Gum arabic 1 oz.; Boric acid 20 gr.; Water 16 fl. oz.; Starch 2 oz. Mix the gelatin, gum arabic and boric acid in 14 fl. oz. of cold water, stir occasionally until the gum is dissolved, heat the mixture to boiling remove the scum and strain. Also mix the starch intimately with the remainder of the water, and stir this mixture into the hot gelatin mixture until a uniform product results. As desired the composition may be tinted with any suitable dye. Before using, it must be softened by the application of heat.

604 C.B., Gwalior—For address of Indian agent write direct to the firm W. Woodwards Ltd., 51, Clapham Road, London S.W.9.

605 G.N S., Mathura—For laundry machine enquire of Jessop & Co, Ltd., 93, Netaji Subhas Road, Calcutta.

607 R.K M.S., Kanpur—Formula of bottle capping solution will be found under No. 603 above.

608 G.C., Jubbulpore—We have no book on manufacture of extracts from crude drugs. For equipment enquire of Prabartak Commercial Corporation, 61, Bowbazar Street, Calcutta. A special article on leather industry appeared in April 1949 issue of Industry.

609 K V., Madanapalle—For refilling ice cream making machine use liquor ammonia.

610 J N.D., Nabadwip—With Rs. 5,000 you may start a washing soap factory. Your enquiry regarding soft wood appears elsewhere.

613 M C., Kamrup—Following is a formula of black board paint· Shellac 16 lbs.; Lamp black 16 lbs.; Prussian blue 1 lb.; Fine emery 8 lbs.; Drier 20 lbs; Methylated spirit 140 lbs.; Raw linseed oil 1 gallon. Dissolve the shellac in the spirit, grind the other constituents well together, and then mix it thoroughly with the solutions.

614 P.S.M., Manbhum—Process of manufacturing ointment and other medicinal preparations will be found in Pharmaceutical Preparations, published from this office, price Rs. 3-7 including postage.

615 G.L., Bharatpur—For glass machines enquire of Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta.

616 S.K.B., Calcutta—Process of manufacturing scented betelnut and other preparations will appear in Formula section in due course.

617 C.E A., Lucknow—For hand printing machine enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

618 N.J., Jubbulpore—You may produce 100 gallons per day each item and sell in the market. Then you may increase your production with the expand of your business.

619 B.L.R., Kanpur—We have no book dealing with the manufacture of essences used in aerated water. Some idea about aerated water manufacture will be found in Manufacture of Syrup and Cold Drinks published from this office, price Rs. 3-7 including postage.

622 S.S., Jharia—You may negotiate with the Superintendent, Campbell Medical School, 138, Lower Circular Road, Calcutta. Price of Pharmaceutical Preparations is Rs. 3-7 including postage.

624 M.S.A, Mathura—We have no book on plastic or aluminium industry. You better enquire of Thacker Spink & Co., (1933), Ltd., 3, Esplanade East, Calcutta and W. Newman & Co., Ltd., 3, Old Court House Street, Calcutta for the books.

625 T.C., Pilibhit—For bottles, corks and labels enquire of Essence & Bottle Supply Co., Ltd., 14, Radha Bazar Street. Calcutta; Sikri Bottle Stores, 14, Ezra Street. Calcutta and Calcutta Bottle Stores, 180, Lower Chitpur Road, Calcutta.

627 P.C.W., Agra Cantt.—Following is a formula of hair fixature: Spermaceti 5 oz.; Wax 20 oz.; Gum arabic 15 oz.; Soap 10 oz.; Water 50 oz., Glycerine 5 oz. The soap is finely shaved, and the gum arabic pulverized; both are then stirred up with 20 parts of water to a homogeneous paste. The spermaceti and wax are heated with the remainder of the water, on a water bath, and stirred carefully into the gum and soap paste. Lastly glycerine is added drop by drop. Add perfumes and colours to scent.

630 M.L.B., Calcutta—Process of manufacturing phenyle will appear in Formula section in due course.

Review of Books

INDIAN POLITICAL PARTIES. Published by the All-India Congress Committee, 7, Jantar Mantar Road, New Delhi. Pages 139, price Rs. 2/8/-.

This book is one of the foremost A.I.C.C. Publications. Party system of Government, we are aware, constitutes the keystone of the democratic arch. So it is essential that Indian masses should have an intimate acquaintance with the functioning of party system, because in the absence of correct appreciation of the functions, aims and object of the different political parties in India, it will be impossible for them to associate with any political party or creed and working of any democratic machinery will be wholly impossible.

The book furnishes us with a brief history of the different political parties, their plans, programme and activity and it has brought out the distinctive characteristic of Indian parties

The authors have made two broad divisions —(a) noncommunal parties and (b) communal parties. Under the first category fall the following parties (1) Indian National Congress, (2) The Socialist Party, (3) The Communist Party.

The Muslim League and the Hindu Mahasabha belong to the second category.

Though an A.I.C.C. publication, the problems have been discussed in an unprejudiced and unbiassed manner.

The introductory chapter deals with a general survey of the different party organisation and systems in the different parts of the world. The succeeding chapters deal with the history, organisation, ideology of the different parties in India.

A close acquaintance with the history and achievements of the different parties in India, will ensure a clear and correct perspective which is sole aim and objective of these publications. We commend this book to our readers.

INCIDENTS OF GANDHIJI'S LIFE. Published by Vora & Co. Publishers, 3, Round Building, Kalbadevi Road, Bombay 2. Pages 344, price Rs. 10/8/-.

This book contains vivid impressions of the outstanding personalities about Gandhiji, impressions of those who came in close and intimate touch with the father of the nation.

Incidents of Gandhiji's life, have been depicted with veracity and with a good deal of objectivity. Gandhiji's conversations had an ineffable charm and grace and embodied deep philosophical truths. All along, Gandhiji's life has been full of experiments with truth and non-violence. In the pages of this book we have a clear glimpse into these aspects of Gandhiji's life.

After the death of the father of the nation it remains for us to spread and propagate his messages and teachings to the remotest corners of Indian villages.

From that point of view, "Incidents of Gandhiji's life," will be a valuable repository of his philosophy, and teachings. From the wealth of information, it furnishes, it appears, that the book, is really a treasurable one, throwing a flood of light on the quintessence of Mahatma Gandhi's philosophy.

Persons, who had come in close contact with him were approached and they responded. The writers are all of outstanding and exceptional calibre and include such persons as Mr. Fenner Brockway, Hon'ble Rajkumari Amrita Kour, Hon'ble Shri Jairam Das Daulat Ram, Acharya J. B Kripalani, and Dr. Sushila Nayar. The book is a rich storehouse. The pages are not only instructive, but also pleasing and delightful. We commend this book to our readers.

HYDRO ELECTRIC DEVELOPMENT IN INDIA. Issued by the Central Board of Irrigation. Pages 24.

This is the fifth of a series of leaflets of general interest issued from time to time by the Central Board of Irrigation. Hydro electric development has a vital bearing on the economic prosperity of India. And in order to enlist the sympathy and active co-operation of the people, it is imperative that the full economic significance of such revolutionary measures, should be completely brought home to the average masses.

India is fortunate to have vast resources of high mountains, and a large hydro-electric power potential. But it is unfortunate we have not been able to produce even a fraction of the necessary amount of electrical energy. Progress has been really very scanty. And the unwholesome feature of this scanty progress made in India is the fact that most of the existing installation have been planned to satisfy the demands in urban areas.

The book gives a history of the hydro-electric development in India. Some of the schemes, originally started before independence were unduly inexpensive.

The leaflet gives us an account of the new hydro-electric projects, launched recently by the Government of India. They have been indicated in maps.

A statistical table has also been appended to this leaflet indicating the number of Hydro electric installations in India in different parts of the country from 1897 to 1947.

The book also contains two important suggestions. The first suggestion is that we ourselves should manufacture the large number of manufacturued goods, that will be necessary for the implementation of hydraulic schemes. The second suggestion is that research on hydro-electric machinery, electric transmission and distribution and electrical devices should be carried on by Indian Engineers and Scientists.

THE WORKMEN'S COMPENSATION ACT. Published by Law Publishing House, 33, Shea Charan Lal Road, Allahabad. Pages 111, price Rs. 3.

The Workmen's Compensation Act by Mr. M. L. Kharbanda contains a critical and lucid exposition of the different provisions of the said Act. Lawyers who intend to deal with these specific cases, will find this book a useful guide The provisions clearly and exactly define the conditions under which compensation is payable to them, as also those which have to be fulfilled prior to any claim for compensation They also explain under what circumstances the employer may be exempted from the liability of payment of compensation.

The book also contains the latest case-law, exhaustive notes and up-to-date amendments.

For the successful enforcement of the laws embodied in the said Act, Commissions have been appointed and their powers have been clearly described and defined.

The procedural details prior to claim for compensation have been also explained

The book will prove useful not only for the purpose of lawyers, but also the employees and workmen as well.

NOTICES & REVIEWS

(Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medical preparation and allied substances in this section.)

CALENDAR

We have received one calendar from Jhaveri Brothers, 149, Shroff Bazar, Bombay 2.

SNUFF

We have the pleasure to receive from A. M Trading Co, 1, Gafoor Sahib Street, Royapettah P.O., Madras four varieties of snuff samples, such as scented, golden colour, brown colour and golden raw snuff. All the preparations are found to be good.

EQUATOR CRAYONS

We are glad to receive from Colour Pen & Co., 154, Harrison Road, Calcutta 7 one packet Equator Crayon and one packet Crayon De Luxe which are found to be satisfactory and can be compared favourably with those of foreign products.

PILOT PLAN FOR REHABILITATION

We have the pleasure to receive a copy of the pamphlet Pilot Plan for Re-Settlement of Refugees and Re-Construction of West Bengal by A. C. Chakravorty, showing the ways and means of solving the most difficult problem of rehabilitation of the Refugees, which is cracking the brains of the Government. In this little book the learned author deals with some scheme which we think, will be easy to carry out without too heavy pressure on the Government. This plan is available from the author at Room 42, 22, Canning Street, Calcutta. Its price is Four annas.

PENHOLDERS

We are glad to receive samples of penholders with nicely fixed Industry and Industry Year Book labels from The Prakash Industries, 3/3, Maharshi Debendra Road, Calcutta.

TRADE ENQUIRIES

(To communicate with any party write to him direct with name and address given below mentioning Industry).

330 Aryan Industries & Engineering Works, Tumkur—Want to be put in touch with the suppliers of 5 to 6 tons of old steel files of 10, 12 and 14 inches long.

346 R. Kunwar, K3492, Seetlagally, Agra —Wants to be introduced to fish dealers

364 Bala Subrahmanyam, 186, Tipparajuvai Street, Nellore—Wants to be put in touch with the manufacturers of mill chimney in Calcutta, Bombay and Madras.

367 Hari Chand Kapar, 814, Baratni Sadar Bazar, Delhi—Wants to be put in touch with turmeric merchants in Sangli.

481 P. Dass Dogra, Hd Pathankote Base, Pathankote, E Punjab—Wants to be put in touch with the suppliers of ice cream paper cups, wooden spoons and cup filling machines.

489 C. Perianayagasamy Chetty, 461, Vedanayagam Chetty Street, Negapatam—Wants to be put in touch with those interested in betelnuts, gum, benzoin, sago, tapioca flour and other Malayan products.

501 M A. Shaheed, Educational Book House, Civil Lines, Aligarh—Wants to be put in touch with the manufacturers of tea cups and tea sets of celluloid and plastic.

509 Himmat Rai & Sons, Church Road, Delhi Cantonment—Want to be put in touch with the manufacturers of sugar of milk and thymol B P.

522 H.M. Samudphone Co, 453/2, Burns Road, Karachi 1, (Pakistan)—Want to be put in touch with the suppliers of Catechu wood (wood from which catechu is manufactured).

546 N.C. Narasimham, Old Post Office Street, Cocanada—Wants to be put in touch with the parties interested in tamarind seeds.

556 Chakravarthy, T.K. Shanmugam Chettiar, Thannirpandalpalayam, Sankari, Salem—Wants to be put in touch with the suppliers of coriander seed, cumin seed, catechu.

574 Bhartiya Udyog Corporation, 193, Fatehpur Bichawa, Tagore Town, Allahabad—Wants to be put in touch with the manufacturers of brass buttons, bangles, churies and dishes.

610 Jagadindu Nath Dutta, Agameswari Para, Nabadwip, Nadia—Wants to be put in touch with the suppliers of soft wood.

673 Chinta Somareddy, Samalkot, E. Godavari—Wants to be put in touch with the parties interested in tamarind seeds and babul gum.

Edited, Printed & Published by K. N. Banerjee for Industry Publishers Ltd

FORTIETH YEAR OF PUBLICATION

FOUNDED BY K.M. BANERJEE

MONTHLY MAGAZINE FOR MANUFACTURERS & BUSINESSMEN

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THE MIRACLE MAN WITH UNRIVALLED POWER

India's Greatest Astrologer & Tantrik-Yogi



JYOTISH-SHAMRAT PANDIT RAMESH CHANDRA BHATTACHARYYA, RAJ JYOTISHI, JYOTISH-SHIROMANI JYOTISHARNAV, M.R.A.S. (London) of International fame, President—World-Renowned **All India** Astrological & Astronomical Society. (Estd. 1907 A.D.) and Permanent President of Baranoshi Pandit Sabha (Benares) elected unanimously on 14 Feb., 1948.

He is the only Astrologer in India or even in the world who **first** predicted the Allies' Victory in the last world war **on 3rd. Sept., 1939** within 4 hours the day of the declaration of war. This **miraculous** prophecy has earned for him praise and honour from **His majesty King** George VI, and Viceroy of India and the Governor of **Bengal**, similarly the wonderful prediction made by Panditji (Vide his Telegraph No. 19 of Hatkhola P. O. dated 3rd. Sept. 1946) about the future of Interim Govt. headed by our Great leader Pandit have already been proved correct.

In recognition of his profound scholarship, genious and Miraculous powers Panditji was honoured with tittle of "**Jyotish Shiromani** by All India Pandit Mahamandali in the gathering of hundred scholars all over India at Calcutta in December 1938 and again in February 1947 with greatest of all titles in Astrology "Jyotish Shamrat" in the presence of 250 scholars all over India at Benares in the Annual Conventions of Baranashi Pandit Sabha. No Astrologer in India has received this signal honour in the annals of India till to-day, who is also the consulting Astrologer of the **Eighteen Ruling** Chiefs of India.

It is well-known that the Astrological predictions of this great scholar, his wonderful methods of redressing the pernicious influence of evil stars, his power to bring success in complicated law-suits and also to cure incurable diseases are really uncommon. Many eminent personalities of the world (**England, America, Australia, Africa, China, Japan, etc.**) have given many unsolicited testimonials of the great Pandit's wonderful powders.

A FEW OPINIONS AMONGST THOUSANDS.

His Highness The Maharaja of Athgarh says—"I have been astonished at the superhuman power of Panditji." **Her Highness The: Dowager 6th Maharani Saheba of Tripura State** says :—"He is no doubt a great personage with miraculous power. **The Hon'ble Chief Justice of Calcutta High Court Sir M. N. Mukherjee, Kt.,** says:—"The wonderful power of calculation and talent of Sriman Ramesh Chandra is the only possible outcome of a great father to a like son." **The Hon'ble Maharaja of Santosh & Ex-President of the Bengal Legislative Council, Sir M. N. Roy Choudhury, Kt.,** says :—Onseeing my son, his prophecy about my future is true to words. **The Hon'ble justice Mr. B. K. Roy of Patna High Court** says :—"He is really a great personage with super-natural power." **The Hon'ble Minister, Govt. of Bengal, Raja Prasanna Deb Raikot** says :—"The wonderful power of calculation and Tantrik activities have struck me with greatest astonishment." **The Hon'ble Justice Mr. S. M. Das, of Keonjhar State High Court,** says :—"Panditji has bestowed the life of my almost dead son." **Mr. J. A. Lawrence, Osaka, Japan,** writes :—"I was getting good results from your Kavacha and all my family were passing a different life since I started wearing." **Mr. Andre Tempe, 2723, Popular Ave., Chicago, Illinois, U. S. America** :—"I have purchased from you several Kavachas on two or three different occasions. They all proved satisfactory." **Mr. K. Ruchpaul, Shanghai, China** :—"Everything you foretold in writing is taking place with surprising exactness." **Mr. Issac Mumi Etia, Govt. Clerk & Interpreter in Deschang, West Africa** :—"I had ordered some Talismans from you that had rendered me wonderful service." **Mr. B. J. Fernando, Proctor, S. C., & Notary Public, Colombo, Ceylon**:—"I got marvellous effects from your Kavachas on several occassions" etc. etc. and many others.

Persons who have lost all hopes are strongly advised to test the powers of the Panditji.

WONDERFUL TALISMANS (GUARANTEED). In case of failure, Money Refunded.

DHANADA KAVACHA OR THE ROTHSCHILD TALISMAN.—Its wearer earns immense wealth with little struggling. Lakshmi resides at his house and gives him son, fame, vast wealth, long life, all round prosperity in life. **Price Rs. 7/10. Special** for Speedyaction **Rs. 29/21.** Super powerful with extra ordinary life long effective **Rs. 129/11.**

BAGALAMUKHI KAVACHA.—To overcome enemies it is unique. The wearer gets promotion in services and succeeds in pleasing higher officials. In winning in civil or criminal suits it is unparalled. This is also a preventive to any accident or danger. **Price Rs. 9/2.** Special for Speedyaction **Rs. 34/2. (The Bhowal Kumar, Winner of the Sensational Bhowal Case, wore this Kavacha).** Super powerful with instantaneous effects **Rs. 184/4.**

BASHIKARAN (MOHINI) KAVACHA.—It brings the desired persons man or woman under absolute control or subjection **Rs. 11/8.** Special **Rs. 34/2.** Super powerful **Rs. 387/14/-.**

ALL INDIA ASTROLOGICAL & ASTRONOMICAL SOCIETY (Regd.),

(The Biggest, Most Reliable and Oldest Astrological Society in India and the Far East).

Head Office:—105 (I), Grey St. "Basanta Nivas". (Sri Sri Nabagraha & Kali Temple) Calcutta
Branch Office:—47, Dharamtola Street, (Wellesley Junc.), Calcutta. Phone B.B. 3685
London Office :—Mr. M. A. CURTIS, 7-A, Westway, Raynes Park.

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A Monthly Magazine for Manufacturers and Businessmen.

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EDITORIAL CONTENTS FOR JUNE, 1949

BUSINESS NOTICE.

SUBSCRIPTION DEPARTMENNT.

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Foreign	--	Sh. 12/-

Including postage, but excluding V.P. and Registration charges.

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Subscribers are enlisted at any time of the year for a period of 12 months. Subscribers will receive 12 issues in all beginning with the issue for the month of enlistment. Subscribers are not enlisted for any period less than a year.

Subscription money is always payable in advance or by V.P.P.

ADVERTISEMENT DEPARTMENT.

Last day of accepting advertisement is the 10th day of the previous month. Any order for alteration or correction of copy is not entertained after that day.

Advertisement rates for ordinary and special position, both casual or contractual, are sent on request.

CORRESPONDENCE.

All enquiries regarding industrial or business information should be addressed to the Editor. Contributions and articles for review and notice should also be sent to him.

All enquiries regarding the Subscription or Advertisement Departments should be addressed to the General Manager.

OFFICE HOURS.

Editorial Department: 11 A.M. to 4 P.M. on weekdays and 11 A.M. to 2 P.M. on Saturdays.

Subscription and Advertisement Department 10 A.M. to 5 P.M. on weekdays and 10 A.M. to 2 P.M. on Saturdays.

Classified Bargains

ADVERTISEMENTS under this head of small announcements cost 4 As. per word, minimum Rs. 3 payable by Postage Stamp or M.O. with order. No vouchers given.
To Readers—In writing to advertisers the Readers are requested to write legibly and quote that they are writing in response to advertisement in INDUSTRY. This would ensure prompt attention. Letters to Advt. No. should be duly stamped.

LIST OF CLASSIFICATIONS.

Agents Wanted	Jewelleries
Agencies Wanted	Machinery & Hardware
Agencies, Foreign	Medicines
Bank & Insurance	Miscellaneous Advtg.
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Books & Periodicals	Patents & Trade Marks
Bottles & Corks	Perfumery & Toilets
Brass Component	Personal & Professional
Brushes	Photography
Button & Ivory	Plywood & Bobbin
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Cardboard Boxes	Printing & Stationery
Chemicals & Minerals	Radio & Electric Goods
Cinema Distributors	Rubber Stamps
Crude Drugs	Sale & Purchase
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Dental & Optical Materials	Small Tools
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Expert Wanted	Springs
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	Textile Materials
	Tin Boxes
	Wearing Apparels

AGENTS WANTED

For Leather & Asbestos Hand-gloves, Prepetual Calendars, Diary covers, Handbags, Purses, etc Apply Bengal Leather Industries, 10-C, St. James Square, Calcutta. 79 AA

For "Organisers and Agents" on suitable terms, apply Oriental Provident Insuran·e ' td 28, Canning Street, Calcutta. Phone Cal. 7'75. 173 AA

Wanted Agents to Earn 500/- Monthly working for Embossers, Nameplates, Locks & Pinning machines Apply International Industries Ltd., Aligarh. 94 AA

Representatives on Rs. 185/- plus commission, Send -/8/- for particulars, Dr. S. Singh 365K, Neel, Delhi. 425 AA

"Wanted canvassing agents and customers on commission basis for Bhavani Carpets and handbags. Apply "Jupiter Carpet Works, Bhavani. South India" 54 AA

Wanted Agents, Earn Rs. 15/- or more daily, For Particulars and agencyterms contact K. N. Kumar & Bros, 6/1, Gurdwara Road, Karol Bagh, Delhi. 596 AA

Wanted Agents to earn Rs. 500-0-0 a month. Write to-day for agency terms to; Empire Calendar Mfg. Co., Post Box 6734, Calcutta 7. 669 AA

Wanted Travelling Canvassing Agents & Customers on Liberal Commission Basis, for Bhavani Carpets & Carpet Bags. Apply to:—The Ganesh Industrials Carpet Manufacturers, Bhavani. P.O. Via Erode. S. India. 274 AA

Waneel Agents & Canvassers for, Khus Root hand-fans Rs. 7/- per dozen. Freight, packing free. Sample Against As. -/12/- also Khus perfumes. Rajasthan Banodyog, Sawaimadhopur, (Jaipur). 600 AA

AGENTS WANTED.

Wanted Agents for Horn and Pearl Buttons, Lily Button Factory, Katherpool, Dacca. 613 AA

Wanted Agents for all kinds of Buttons and Tailoring Materials, Industrial Distributors D-5/89 Tibbia College, New Delhi. 482 AA

Agents distributors required for radios in all towns. Apply Advr. No 540, C/o. Industry, Calcutta. 540 AA

Application Invited for agencies of our fancy manufactured goods of everyday use. Nelson & Nicholson, P.B. 256, Delhi. 634 AA

Wanted Agents pay Rs. 200 allowance daily Rs 5 and on commission for foreign goods, Lalit Import Service, Sadarbazar, Delhi. 496 AA

Wanted District Agents in every District for Genuine English Relief Nibs 314. Apply Eastern Import Agency, Post Box 176, Delhi. 7 AA

Wanted:—Agents and Stockists for our High class Horn and Pearl Buttons. J. Smith & Co, 186-5, Gopal Lal Thakur Road, Baranagar, Calcutta. 132 AA

Wanted Commission Agents, Seep Ivory Coat, Pant, Buttons, Samples Rs 5/- Bhagwan Store, Chandi Market, Saddar Bazar, Delhi. 237 AA

Wanted Agents for the sale of our Products (Hand Bags, Holdals, School Bags, & Leather goods). Samples against cost. Eskey Industries, Bazar Thara Sahib, Amritsar. 606 AA

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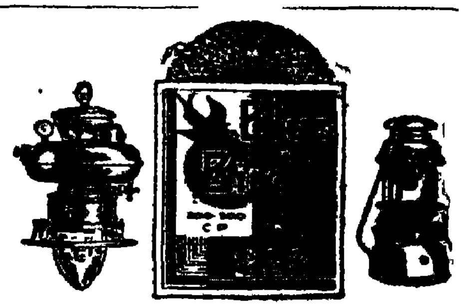
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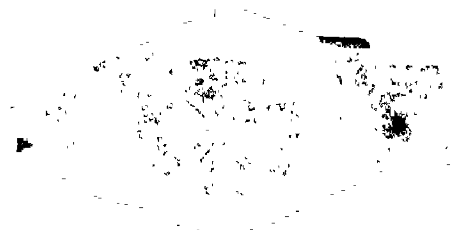

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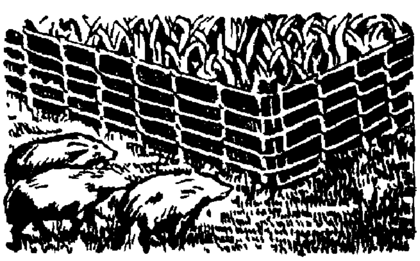
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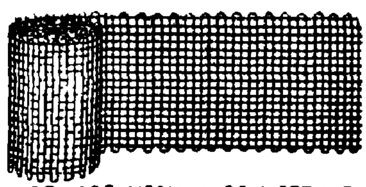
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Industry

EDITOR:
K. N. BANERJEE.

VOL. XL. CALCUTTA, JUNE, 1949. No. 471.

DRIVE FOR QUALITY PRODUCTION:

THE NEED OF THE HOUR.

THE principle of discriminating protection is still being followed by the Government of India in case of the indigenous industries. But this protecting ring of Government should by no means lull them into a false sense of security and safety. Even from the very outset, it should be the primary concern of the industries to dispense with these protective tariffs within quickest possible time. Besides, the incidence of protective tariffs for an unduly long time is always irritating, aggressive and unfair and even hostile to healthy international commerce and trade.

But tariff protection cannot be dispensed with, unless and until our industrial products have attained a certain standard of excellence, quality and finish. Improved excellence and finish are, in fact, necessary conditions for the very existence of our industries. Not to speak of the external market, even the home market will slip out of our hand if our industrial system fails to purge itself of its twin defects, viz., relatively low quality and high costs.

But quality depends upon factors of such bewildering variety as to baffle all our analysis. It is high time that manufacturers should disentangle them one by one and search for the inherent defects in their productive system. Defects mainly relate to raw materials, machinery equipment, efficiency of labour and lastly management.

After doing all that is humanly possible to remedy these chronic defects, the finished products may then be placed before the bar of the Indian Standards Institute.

Everything, however, depends upon the co-operation of manufacturers. We are, however, of opinion that manufacturers should co-operate to their own benefit. This self-imposed obligation, on their part, will, we think, provide them with the necessary stimulus and incentive for the improvement of their production.

The manufacturers should always bear in mind that the protection, they are enjoying now, may cease at a subsequent date. And that the same policy of discriminating protection may not be observed by the future Government who will step into the shoes of the present Government. So this is the most opportune moment when they should stabilise their own position by the fullest utilisation of this privilege.

Current Topics

BOBBIN INDUSTRIES

The bobbin industry made substantial progress, during the war period. This progress is largely due to availability of cheap wood in different parts of the country. Another reason, usually cited, is the simplicity of its equipment necessary for the manufacture of bobbins.

But it is regrettable that despite this positive advantages, bobbin industry, in India, can scarcely face foreign competition, especially in point of quality.

The Indian Tariff Board recently examined its case for protection and have made a number of recommendations which, when implemented, will surely pave the way for improvement of the quality of Indian-made bobbins.

The Board have recommended that so long as licensing of imports of bobbins is continued for balance of payment considerations, the desirability of maintaining and expanding the indigenous production of the article should be kept in view, and the quantum of exports should be regulated accordingly. They have further recommended that imports of foreign timber should be allowed to that extent, necessary to supplement the supply of indigenous timber, and that all applications should be scrutinised before such permits may be issued.

These two recommendations are under the active consideration of Government of India and will, in all probability, be accepted. We strongly feel that there should be on the part of manufacturers an intensive drive for the improvement of quality of bobbins. The Government of India, have drawn the attention of the bobbin manufacturers, to the Board's recommendation that the manufacturers, should in the quickest possible time, equip their factories with modern machines and tools. Great care and circumspection should also be exercised in the selection of machine tools.

The Board also recommended that the Government should afford all possible facilities, for the supply of three types of timber, e.g. haldu, kalan, and mango.

By the way, it may be pointed out that most of the Indian manufacturers are ignorant of the scientific seasoning process. The bad results, we usually get, are largely due to wrong and unscientific seasoning process. The Government are now considering the recommendation that adequate tests should be carried out, regarding the suitability of various kinds of timber for the manufacture of bobbins.

Indian textile mills can certainly be persuaded to make extensive use of bobbins, provided they reach a specific standard and quality. The Indian Standards Institute have already appointed two Subcommittees to evolve standards specifications for jute mill bobbins and cotton mill bobbins respectively.

The Board emphasises that these two Sub-committees should be required to expedite their work. Besides, the Board suggests that the Government should appoint two timber experts for carrying on a rapid survey of the industry and draw up a list of factories which are suitably equipped to produce quality bobbins.

Most of the recommendations, referred to, above, are calculated to render substantial benefit to the bobbin industry in India.

INDUSTRIAL HOUSING.

The Government of India have recently announced an ambitious plan

among Provincial Governments with a view to alleviate the acute shortage in housing. According to this scheme, a target of one million houses is to be achieved in ten years and the pattern of houses to be constructed, differ widely from the previous ones in that they contain much greater amenities than those contemplated earlier. We gather from reliable sources that the proposed scheme is going to be soon carried into practice. And accordingly it proposes to set up Central and Regional Housing Boards.

As for the financial arrangements, the capital required for industrial housing will be provided by the Central and Provincial Government or any employee, sponsored by the latter in the proportion of 2 to 1. This large sum of loan, furnished by the Central Government will have to be returned in 25 equal instalments from the date of the establishment of a sinking fund.

The Government of India, therefore have evidently ruled out the grant of any subvention in future.

The sinking fund will be contributed by the parties, the employees, and the Provincial Government. It is evidently a joint contribution and therefore a joint responsibility—The Employees' contribution will be in the form of rent for these workers at the rate of not exceeding 3 per cent. of the total capital cost. The employer's will be at the rate 2 per cent. of his wage subject to the limit of 2½ per cent. of the total capital cost. Provincial Government's share will be the residual amount while Central Government's share to the general scheme will be the payment of 2 per cent. on the cost, so long as the borrowing does not exceed 3 per cent.

Housing problem is one of the basic problems which has to be immediately tackled effectively and satisfactorily. In fact, labour problem cannot be amicably settled, unless we can make minimum provision for a healthy and congenial home for labour.

In the context of present circumstances it is not possible for employers to shoulder the responsibility alone. It is, therefore highly encouraging that the Government of India have come forward with such a bold and creative plan agreeing to share a major share of the burden and responsibility.

But we, however, entertain, grave doubts as to the complete feasibility of the schemes. As a matter of fact, difficulties may arise with regard to procuration of requisite finances viz. 750 crores for 75,00 million houses. But a certain degree of success may certainly be attained and now that the responsibility is to be a collective affair.

IMPORTANCE OF STATISTICS.

The Bombay Government have recently decided to recruit a number of economic investigators to carry on a detailed survey of the sources of income and pattern and expenditure of the people. This is really very commendable and deserves the enthusiastic support of the people.

It is highly desirable that enquiries on similar lines, should be started immediately in the different provinces of India.

What India needs more than any thing else to-day is more and better statistics about the facts of her economic and social life. This alone will enable her to chart out her future, stimulate enterprise and check up her progress.

Compilation, we feel, should forthwith be started particularly with reference to (1) trends of prices (2) trends of wages, (3) trends of production in each industry, (4) agricultural products, (5) trend of unemployment and national problems.

In United States information compiled by the Census Bureau, a permanent institution, is a valuable storehouse available to the newspapers, magazines, and public speakers, scientists and research scholars may rely on this statistics as a guide to their conclusions or a help in conducting experiments. State, local and National Government agencies rely on the census Bureau figures, as a basis for all kinds of planning. Managers of Business and Industrial establishment make extensive use of the tremendous store of information gathered by the Bureau through frequent special business and industrial surveys. Manufacturers and wholesalers also keep themselves abreast of the available information.

Statistics, is, as it were, the life-breath of economy. It is desirable that they should be increasingly employed in India in the larger interests and welfare of the country.

To ensure perfect accuracy in statistics it is proper that the task should be entrusted to competent and reliable authorities.

ART IN INDUSTRIES.

The activities of the Indian Institute of Art—a young Institution, are designed to bring the artist into close co-operation with industry of help to improve the quality of Indian products. It is desirable that the activities of this young Institution should receive due appreciation and recognition from one and all. In this connection Mr. Nityananda Kanungo, the Minister for Commerce rightly observed "Indian Industry cannot stand in competition even in the home market against the goods from other countries which are most beautifully designed."

The Institute, however, cannot work miracles overnight. The education of the large number of Indian producers, in designs and craftsmanship is necessarily a long-term process.

The extent of its success will, however, in a large measure depend on the organisational set-up of the Institute. And we note with hope that a beginning has already been made in the organisational structure.

The Central Government are obviously evincing keen interest in its activities and propose to send two representatives as members of the Executive Committee.

The Institute will, in the first place, begin with 3½ lakhs which is quite a moderate sum in comparison with similar investments in the West. We hope, the Institute will grow from more to more with the active co-operation of businessmen and industrialists.

The functions of this Institute, it is obvious, will be of vital and fundamental importance. It will, in the first place, undertake training of Industrial designers either in a school of its own or in collaboration with Art and Technological Institutions, already in existence.

Of no less importance is the proposed educational experiment, this Institute proposes to undertake for children of school-going age with the help of photographic material and films. Industrial or technical bias, among the juvenile is the first step towards industrial efficiency.

So one can never think of disapproving or discouraging a move that will go a long way to vitalise the stereotyped, ossified pattern of education which is prevailing to-day. Even in their teens boys should be taught the various applications of art to industry and should be taught what miraculous results might be achieved by a perfect wedding of Art and Industry. As a matter of fact, Japan's industrial progress, is to be attributed, not to an inconsiderable extent to the widest application of art to industry.

HOW TO SECURE FOREIGN CAPITAL.

Foreign investment and foreign technical aptitude are indispensable for our economic advancement. But they will have to be employed with caution and restraint and in certain proportions so as not to strangle our own industries and our native genius.

Mr. Visveswara, the noted industrialist, has given his considered opinion on this problem of vital importance and has put forward concrete suggestions which merit our close attention.

Two ways, Mr. Visveswara, asserts, are open to India. Firstly, she may induce the Americans to purchase dollar loan certificates. And on the strength of these certificates she may purchase the requisite machinery which are indispensable for her industrial advancement. Secondly, the premier manufacturing firms, may easily branch out; furnish the requisite machinery and technical personnel and may place the charge of supervision and superintendence mainly in Indian hands.

It is desirable that India Government should experiment upon any of these two methods, and see for herself, which of the two seems appropriate to her needs and requirements.

We are of opinion that America is the only prospective source of these necessary supplies of machinery and technical personnel. So India should come in closer and closer touch with America in her future commercial intercourse and agreements.

TANNING INDUSTRY FACES CRITICAL CONDITIONS.

India's tanning industry is one of those industries which has grown and flourished without the active support and assistance of the Government. But to c grave disappointment we find that it gradually declining. It is really very u fortunate that the industry should be such a low ebb, when the shoe we ing habit is fast spreading among c countrymen. Matters have come to head and we can scarcely afford to complacent. The situation obviously c mands a searching enquiry and analy on our part.

An analysis, we are sure, will rev that two factors are mainly responsi for this setback. These are (1) Wi spread labour unrest on the one hand a shortage of raw materials on the other

Shortage of raw materials, would ha been more pronounced, but for the f that the existing tanneries are not wo ing to their capacity on account of lab unrest.

South Africa is the main source supplies, but recently India has snapp her trade relations and the necessary su plies have consequently ceased. So attempts at wattle-bark plantation ha no doubt, been made by the Madras Go ernment but the supplies are too inac quate and insufficient for our requi ments.

It is, therefore, imperative that turn to alternative sources of supplies these basic requirements. East Afri we gather from reliable sources may se as a probable and potential sources of o immediate requirements. The Southe Indian Skin and Hide Merchants' As ciation has therefore urged upon the Go ernment of India to initiate negotiati with the East African Government w a view to obtaining the necessary ra materials from that country. The Ass ciation has also requested the Gover

ment to allow a Purchasing Mission to go abroad. And what can be more disquieting than the fact that even the Government reserves of wattle bark and stock of quebrach extract imported in 1946 and 1947 from Argentina have all been completely exhausted? There can be no two opinions in regard to the fact that unless supplies of wattle bark from East Africa are increased and substitutes like quebrach are allowed to be imported in larger quantities from Argentina, the production of East India tanned skins, which is already reduced by 50 p.c. must show a further decline.

But this is not the only perplexing question which should engage the Government of India. There is another, still more baffling—viz., widespread labour unrest. The unrest shows no abatement but is gradually assuming serious proportions and it is why arrivals of tanned skin in Madras Market, have slackened off considerably.

NEED FOR TECHNICAL PERSONNEL

All India Council for Technical Education was set up in 1945 with the avowed object of eliminating our lamentable deficiency in technical aptitude and ability.

This Council, has, however, nothing very substantial and remarkable to its credit. But as Mr. N. R. Sarkar points out, it has vast scope and possibilities in future, provided the activities of this organisations are carried on sound and realistic principles. Mr. Sarkar rightly observes that now that India is free, the Council can push ahead with its schemes untrammelled by restrictions with reference to two basic principles e.g., (1) The basic and paramount need is the proper co-relation of education with our industrial and agricultural requirements. (2) Secondly technical instruction should be broadbased and considered as a form of mental training.

We agree with Mr. Sarkar and therefore hold that any technical system of education, divorced from the above basic principles is likely to prove futile.

MANUFACTURE OF CARBON BRUSHES

THE manufacture of carbon brushes for use on electrical machinery is closely connected with the development of electrical industry. In practically all forms of electric motors and generators, currents flow through conductors carried on the revolving part of the machine and in a majority of these machines the current must be conducted from an outside source to these revolving conductors, or vice versa. This is accomplished by means of a number of small pieces called brushes which bear against the revolving surface. Copper leaf and gauze were first used for this purpose, but as the size of the machines increased, they were found to be disadvantageous, as they burned and wore the moving parts in contact with them. Carbon is the only material which combines the electrical and mechanical properties required for this purpose for nearly all machines. It may be and is at times combined with metallic powders. Although the brush is small and simple in relation to the motor or generator on which it is used, the successful operation of the machine depends to a great extent upon the qualities of the brush. Poor or improper brushes can rapidly ruin parts of electrical machinery, as well as cause electrical troubles.

RAW MATERIALS.

The raw materials for brushes, with widely varying characteristics are very great. The principal raw material is the petroleum coke. Other materials are lampblack, carbon black, graphite and even retort carbon. Metallic powders, such as copper, zinc, lead and tin are employed either alone or together in the so-called metal carbon brushes.

MACHINERIES REQUIRED.

The following machineries are required for the manufacture of all kinds of carbon brushes:—

1. Crushing and grinding roller mill.
2. Steam Jacketed mixer.
3. Sieves of different meshes.
4. Moulds.
5. Semi-automatic brushmoulding hydraulic machine.
6. Cake pounder.
7. Hydraulic press.
8. Cutting saws.
9. Boring tool etc., etc.

SUITABLE COMPOSITIONS

	Parts.	Parts.	Parts.	Parts.
Petroleum coke	65 to 70	60	50	50
Graphite	10 to 15	10	—	50
Coal tar	20	20	20	25
Lamp black	—	10	10	—
Retort carbon	—	—	50	—
Metallic powder	—	—	10	10

OUTLINE OF THE PROCESS.

The raw materials are first calcined to drive off volatile matter and impurities. In small works the calciners may be coal fired. Lamp black and graphites are ordinarily not calcined. When electric calciners are employed, products of varying resistivity may be produced by controlling calcining temperatures and length of time of the operation.

The calcined materials are then pulverised to a flour and screened. The grinding is done in a wide variety of mills, the most generally used type is the roller mill with air separation and pulverizers of different makes. The screened product is a fine carbon flour, the greater portion of which is 200 mesh or finer.

The dusts are weighed, the lampbla·k, graphite, metals, etc., according to the formula to be employed for the specific brush being made, are added and incorporated with the proper binders in steam-jacketed mixers. The binders are. coal tar pitches and coal tars. In some cases benzol, or a similar solvent is employed; in others, other types of tars are added.

The fine carbon powder as obtained above is put into a kneading or wet mixing machine. Here it is intimately mixed with coal tar, which is used as the binding material as to work the carbon flour into a plastic mass. Of course, in using the wood plastic we do not mean that so much tar should be mixed with the carbon powder that it can be kneaded like baker's dough, as a mixture of that consistency would be squirted out of the press with very little pressure, while the carbons, when baked would be porous. The amount of tar mixed with the carbon flour is from 25 to 30 p.c., and this mass, after having been kneaded, hardly seems sticky; in fact, it is easily brken into chips. Great care should be taken to use only tar that is dry, as common tar generally contains water. The dry tar may be obtained by heating the ordinary tar by means of steam for a few hours.

After the material has been well mixed in the wet mixer it is subjected to some further kneading. This is now generally done in roller mills. After thoroughly kneading it is put into the "form pounder" Into this form the kneaded material is put, and the pounder over it stamps the material into cakes that fit into the cylinders of the hydraulic press.

The carbon cakes after being finished in the pounder are taken to the advance presses and pressed into finished cylindrical cakes which are then ready to be moulded or squirted into carbon brushes or rods.

Brushes are made either by moulding or extension. If made by moulding, they may acquire their final shape in the "green"; if made by extrusion, they are formed into rods which are later cut up.

MOULDING.

When the brushes are moulded, the material from the mixer may be fed directly to the moulding press and used as such, but generally the mix is allowed to cool and harden. The material is then reground, pulverised and remixed. Brushes may be moulded in multiple or singly by means of the most modern semi-automatic brush moulding hydraulic machines. These are in many cases self-feeding, automatic pressing and ejector discharging of the finished product. In some other cases the hot material from the mixer is placed in steel moulds, and moulded in a hydraulic press under pressures of 10 to 20 tons per square inch into slabs of varying thickness but of more or less uniform in surface.

EXTRUSION.

When brush stock is extruded, the operations are performed by a squirting press. The dies are rectangular or round, depending upon the shape of the brush to be made. As the material comes out of the press it is cut by hand in pieces of proper length to be most expeditiously handled in further operations.

BAKING.

The green shaped pieces, either in the form of brush shapes, slabs, or rods, are inspected and sent on to be baked. Brush baking furnaces are usually very much smaller in size than those employed for electrodes. The green stock is packed in saggers, usually of refractory materials, with powdered calcined coke as a packing material. Temperatures are first raised slowly, then move rapidly after the preliminary coking of the binder. Final baking temperatures are from 1050° to as high as 1300°C. The length of time of baking will depend upon the furnace, its type, the charge, the method of heating, etc. In the highest type of brush, the electro-graphite, baked blocks are graphitized in an electric graphitizing furnace. Baking furnaces for production of the

linary carbon brush are of many types, her oil, gas, or coal fired, and in some w cases electrically heated.

CLEANING & GRINDING.

After baking, the slabs or rods are aned for packing dust and cut into the quired sizes by carborundum or other rasive saws. They are smoothed and en ground to exact size between high eed parallel wheels of abrasive comsition. Sizes are controlled to within veral thousandths of an inch to insure eir proper fitting into the holders on the ctrical machines for which they were ide.

After grinding to size, the brushes are red and countersunk for the pigtail onductor) attachments. Certain types of ushes have their upper ends and pigtail cket copper electroplated, others tinned hot dipping. This is done to insure rfect contact between the brush and the gtail which is attached by either riveting soldering. The brushes are then inected, tested, stamped and sent to the swer.

Each grade of brush is described by composition and by certain physical aracteristics. These are determined by reful laboratory tests. If used prorly they will materially aid in the selecon of a grade of brush best adapted to given service. The specific resistance expressed in ohms per inch cube. he carrying capacity is the load curnt density the brush can carry without rious heating. Brushes are adapted ly to ranges of commulator peripheral eeds and the same brush will not funcon properly at all speeds. The hardness brushes, as determined by the scleroscpe gives the following classification:—

leroscope Reading.	Degree.
0-15	Very soft.
16-30	Soft.
31-15	Medium.
46-60	Hard.
61 or over.	Very hard.

Hardness of a brush is often considered an index of its abrasive qualities, but these two properties are entirely distinct. A very hard brush may possess very little polishing action on a commutator while a much softer grade may be very highly abrasive. Hardness is a function of manufacturing processes; abrasiveness depends upon the constituent materials of the brush.

By abrasiveness is meant the mechanical grinding and polishing action a brush exerts on the commutator and brush faces, peripheral speed, brush pressure, etc., influence the abrasive effect of the brush so that it is practically impossible to employ an arbitrary scale to classify varying degrees of abrasiveness. Often the operating conditions cause the brush to appear more abrasive that it really is. If subjected to very heavy and quickly applied overloads, a non-abrasive brush may become slightly abrasive. The action is then due to the electrolytic action between the brush face and the commutator, caused by the heavy short circuit current when the overload is taken on or dropped off. The brush picks up copper, which causes it to wear the commutator.

DEPILATORIES & THEIR PREPARATIONS.

DEPILATORIES are preparations generally used for the removal of superfluous hair from the face, arm pits and legs. The majority of depilatories in use to-day owe their efficacy to the presence of a sulphide of either the alkalies or alkaline earths. They rapidly convert the hair into a soft pulpy mass which can be easily scraped off the skin. Since the composition of a depilatory material is of

corrosive nature it should not be left in contact with the skin top long otherwise it may cause irritation. Hence the user should apply this substance with caution.

DIFFERENT TYPES.

Depilatories are prepared in four different types, namely liquids, pastes, powders and waxes. The wax type is not a chemical depilatory at all, by simply afford a mechanical means of removing the hair by trapping it so that it can be pulled out as the layer of wax is removed from the skin. The most popular types of depilatories are the pastes and the powders.

DEPILATING INGREDIENTS.

The chemicals possessing depilatory properties are the sulphides of barium, calcium, sodium, potassium, and strontium. The most popular of these is the compound of barium. It has excellent depilating properties without being excessively harsh. Sodium and potassium are too strong, in view of which their application is confined to liquid preparations containing a little glycerin to offset its irritating action. The depilating properties of calcium sulphide will often do serious injury by developing a blue colour over the spot due to presence of a trace of iron in it. Thallium acetate was suggested by some dermatologist but its constitutional effects may be serious: hence its use should be restricted.

PERFUMING INGREDIENTS.

Owing to the unpleasant odour of depilatories when they are applied to the skin it is very difficult to obtain a perfume which will be of any practical value. The perfume materials usually employed are rose geranium, patchouli, lavender, khus oil, terpinol and thymene.

CARRIERING AGENTS.

The formulas for powder depilatories consist of depilating agent and a carrier such as talc or titanium dioxide togeth with starch, which when moistened, wi water, will form a moderately visco paste. The materials for the carrier a corn starch, talc, titanium dioxide a zinc oxide. Sometimes a small amou of powdered soap is added to act as binder, but it is not necessary when star is present. To these basic materials local anaesthetic such as benzocaine menthol is often added.

Manufacturing procedure involved making powdered depilatories is ve simple. The equipment required consi of a dry mixer and a sifter. It is esse tial that the mixer be extremely tight b cause the depilatory will break down contact with air. As soon as the produ is finished it should be packaged at on and the package used should have a ve tight seal.

DEPILATORY POWDERS.

The following formulas illustrate va ous modifications of powder depilatori

I.

Barium sulphide	70 parts
Titanium dioxide	46 ,,
Starch	80 ,,
Menthol	½ part.
Lavender	3½ parts

Dissolve the menthol in the essent oil; rub it up with a little starch. Sift t titanium dioxide and barium sulphide in the mixer. Mix and sift in the remaind of the starch, then sift in the menthol pe fume mixture. Mix the entire batch f about half an hour and then fill co tainers.

II.

Barium sulphide	56 parts.
Powdered soap	10 ,,
Starch	80 ,,
Zinc oxide	50 ,,
Rose geranium	3½ ,,
Benzocaine	½ part.

Mix the benzocaine and perfume and rub it up with a little of the starch. Sift the barium sulphide and the zinc oxide and the remainder of the starch into the mixer and mix. Add the pulverized soap and the perfume mixture. Close the mixer and mix for about half an hour. Fill in cartoons.

III.

Strontium sulphide	50	parts.
Barium sulphide	20	,,
Corn starch	20	,,
Calcium carbonate	56	,,
Lavender oil	4	,,

Mix as before.

IV.

Barium sulphide	2	parts.
Zinc oxide	3	,,
Starch	3	,,

Mix.

V.

Sodium sulphide	6	dr.
Lime powdered	3	oz,
Starch	2	,,
Powdered orris	1	,,

Mix. This may be perfumed with 5 drops of ionone in place of orris, which can be replaced by talc or by more starch.

PASTES.

Depilatory pastes are obviously more difficult to produce them its powders because the depilatory action of the paste must not be impaired while at the same time the body of the paste should possess sufficient fluidity to make its application easy. To combine these properties in a paste that will not get dry on keeping is not as easy as it might seem. Method of keeping a depilatory paste is to make calcium sulphhydrate by passing hydrogen sulphide gas into lime water. When the reaction is completed the calcium sulphhydrate will have precipitated out. But instead of removing the precipitate, it is customary to leave it in the mixture and to add a sufficient quantity of some inert materials such as zinc stearate, talc, titanium dioxide, starch, chalk, clay, etc. to make a paste of requisite consistency. Another method consists in making a powdered depilatory according to the stated formulas and making it into a paste by adding a mixture of glycerine, water and soft soap. Still another method is to take quicklime and slake it with water and then add to the slaked lime about two and half times as much sulphur. Add more water and boil until the sulphur dissolves. The water lost by evaporation is replaced and the mixture is made into a paste by the addition of inert materials such as those described above.

Sometimes a small amount of barium or strontium sulphide is added. It is undoubtedly true that although pastes made by passing hydrogen sulphide into lime water are most satisfactory from every point of view, persons lacking experience will find them somewhat difficult to make. Hence the following typical formulas are recommended.

I.

Fresh sulphurated lime	50	parts.
Colloidal clay	10	,,
Starch	30	,,
Chalk, precipitated	70	,,
Glycerin	38	,,
Perfume	2	,,

Make the sulphurated lime as follows: Take 32 parts of quicklime, 50 parts of sublimed sulphur, 3000 parts of water. Add a small quantity of the water to the lime sufficient to slake it. Boil the remainder of the water. Mix the slaked lime and the sulphur and gradually add the hot water. Then boil the mixture with frequent agitation until a sufficient amount of water has been driven off. Keep boiling for about one hour adding

water from time to time to make up the loss by evaporation. Then allow the mixture to stand until cool and strain it. Take the amount of sulphurated lime of the formula, mix in the glycerin. Sift and add the dry materials until a paste of the proper consistency is formed. Add the perfume.

II.

Strontium sulphide	30	parts.
Barium sulphide	30	,,
Talc	20	,,
Corn starch	40	,,
Glycerin	36	,,
Water	40	,,
Perfume	4	,,

Mix the sulphides with the water and glycerin Mix the starch and the talc; sift the dry materials into the sulphide solution. Mix well and add the perfume.

LIQUID.

It has already been stated that depilatory liquids are mixture of sodium sulphide, water and glycerin to which, sometimes, starch, clay or saponin are added. The following typical formulas are recommended:—

I.

Sodium sulphide	14	parts.
Glycerin	20	,,
Water	160	,,
Rectified spirit	5	,,
Perfume	10	,,

Dissolve the sulphide in a quantity of water: add the glycerin and mix. Add the remainder of the water and finally the perfume, dissolved in the alcohol, mix well and filter. The strength of this type of depilatory can be increased by adding more sodium sulphide but in no case should it exceed 10 per cent.

II.

Sodium sulphide	30	parts.
Starch	30	,,
Ethyl ether of diethylene glycol	30	,,
Water	200	,,
Alcohol	8	,,
Perfume	2	,,

Dissolve the sodium sulphide in part of the water. Make a paste with the glycol and the starch and add this to the sulphide solution, then add the remainder of the water and the perfume dissolved in the spirit.

Mix thoroughly. In this formula the starch is optional and this may be omitted if so desired.

III.

Sodium sulphide	2	parts.
Distilled witch hazel water	12	,,

Mix and dissolve.

DEPILATORY WAXES

I.

Beeswax	25	parts.
Hard paraffin	17	,,
Resin	52	,,
Petrolatum	5	,,
Perfume	1	part.

Melt the resin and the waxes, mix and add the petrolatum, then reduce the temperature to about 60°C and add the perfume, and pour the melted mass into suitable moulds. When this wax is used it is melted and painted over the surface to be dehaired.

II.

Resin	65	parts.
Carnauba wax	20	,,
Boiled linseed oil	10	,,
Beeswax	5	,,

Melt all together and pour into suitable moulds.

PORTLAND CEMENT AND ITS MANUFACTURE.

THE production of portland cement is the most important non-metallic constructive material used by engineers at the present time. Throughout the world this industry ranks among the first eight extractive industries, being exceeded in importance only by coal, pig iron, gold and stone.

Although the industry has expanded with great rapidity still India could not maintain her position until it has been rescued by the Government of India on the recommendation of Tariff Board.

Portland cement is a compound consisting chiefly of silicates and aluminates of lime, produced by the calcination to incipient vitrification of a mechanical mixture of chalk and clay; or similar materials containing the requisite chemical constituents the clinker thus produced being subsequently ground to a more or less impalpable powder. The process by which it is manufactured is a simple one and does not call for any lengthy description. The only materials necessary are limestone or chalk, clay and gypsum. In Great Britain the chalk used is almost pure carbonate of lime and the required percentage of silica and alumina are obtained from the clay. Indian limestone contains these substances in varying proportions, and the amount of clay required, therefore, also varies. In the Gwalior State limestone so nearly contains all the elements necessary that the percentage of clay in the mixture is less than one per cent., and in Rajputana no clay is used at all, the actual proportion of the elements necessary being obtained by mixing different grades of limestone. These are extreme cases, however, and in most of the Indian works substantial quantities of clay have to be used. The proportion of gypsum necessary is given as about 5 per cent. of the output of cement, but the quantity varies according to the setting time that is desired.

RAW MATERIALS

The raw materials used in the manufacture of Portland Cement may be classed as:—

(a) Cement materials proper.
(b) Fuels.
(c) Fluxes & retarders.

The cement mixture proper includes Limestone, marl, shells, clay, etc. For fuels coal, oil or gas may be used. Fluxes and retarders include gypsum, calcium chloride, alkalies, fluoxite etc., which are added to the cement mixture at different stages to accomplish certain specific purpoes.

ACUTAL EQUIPMENTS

The equipments necessary for Wet Process are:—

Plant using limestone and clay.

(1) Fairmount crusher.
(2) Williams crusher.
(3) Wash mill.
(4) Tanks.
(5) Wet Kominuters.
(6) Tube mills.
(7) Slurry basins.
(8) Kilns 170′ long.

Plant using marl and clay.

(1) Pug mills.
(2) Tanks.
(3) Tube mills.
(4) Kilns 100′ long.

The equipments for Dry Process are as follows:—

Plant using limestone and shale.

(1) Gates crusher.
(2) Mosser drier.
(3) Kominuter.
(4) Tube mills.
(5) Kilns.

Plant using limestone and cement rocks.

(1) Crushers.
(2) Rotary Driers.
(3) Ball mills.

(4) Tube mills.
(5) Kilns.

OUTLINE OF THE PROCESS.

The essential feature in the manufacture of Portland Cement is the formation of fairly definite compound under the action of intense heat. Firstly raw materials of proper chemical and physical composition must be intimately mixed in proper proportion, then drying and fine grinding is necessary to secure the very intimacy of the mixing. The raw materials thus prepared are burnt at a very high temperature until it unites chemically and physically as a clinkered mass. The clinker so formed is ground very fine.

PREPARATION OF THE MATERIALS.

The grinding and mixing operations may be performed either by (a) Dry process or (b) Wet process according to the p.c. of water present in the raw materials used.

Taking chalk and clay as typical wet raw materials, the first step is to mix them in a wash mill, The wash mill is a large cylindrical tank usually made of concrete, with a vertical shaft carried on a concrete pillar which fills the middle of the tank and leaves an annular space between itself and the walls of the tank. The shaft carries horizontal arms from which harrows are slung by means of chains. The teeth of the harrow are attached to the horizontal bars, which in turn, depends from the chain. By this arrangement any solid mass in the tank is struck with a flait-like bellow and the lumps present are immediately smashed. The result is that a slurry or "slip" fairly uniform and fine is obtained. The proportions of chalk and clay introduced must be such as to give a cement containing 62-63% of lime. Usually proper quantities of chalk and clay are weighed into the wash mill and then mixed, final adjustment being made in a dosage tank. The dosage tank is merely an agitator with a vertical spindle carrying a horizontal frame work to which are attached vertical bars or paddles so as to stir the mixture thoroughly and continuously. The whole arrangement is not unlike a wash mill, but as its main function is not to grind but to make a uniform mixture, the vertical bars are attached rigidly to the frame work instead of swinging loose as in the wash mill.

The finely ground slurry of correct composition is now conveyed to the bulk mixing or storage tank which is made of brick or concrete provided with stirrers to prevent any settlement taking place. The slurry thus prepared is then pumped to the kiln direct for calcination.

DRY PROCESS.

In dry methods of preparation, the raw materials are almost always dried to remove moisture. The drying may be done before grinding, or usually the two raw materials are first covered and partly reduced separately, then dried and finally mixed and pulverized. The raw materials may contain 1.50% of water when they reach the mill. In a dry process it is necessary to remove practically all of this water. The most commonly used drier is a cylinder of about 5′ in diameter and 40′ in length, set at a slight inclination to the horizontal and rotating on bearings. The raw material is introduced at the upper end of the cylinder. As the cylinder revolves, the charge slowly moves towards the lower end and by the action of gravity and gradually gets deprived of moisture. The dried charge falls from the lower end into an elevator boot and carried to the grinding mills. The drying cylinder is heated by a separate furnace or by waste gases from the cement kilns. From the driers, the charge passes separately to the ball mills for the first grinding. The ball mill is essentially a drum lined with perforated metal plates

stepped and outside this is a screen and the coarser parts drop back into the mill. From the ball mills the crushed ingredients are mixed thoroughly by being conveyed together to the steel bins feeding the tube mills and thence ultimately to the rotary kiln.

CEMENT BURNING.

The burning may be done in stationery kilns which may be.

(1) Dome or intermittent Kilns.
(2) Ring or Hoffmann Kilns.
(3) Continuous shaft Kilns.

The dome kiln is the earliest type of kiln used in Portland cement manufacture but was later on succeeded by improved types of stationary kilns e.g. Hoffman's or continuous shaft. Though Hoffmann kiln is used extensively in Germany yet it has never come into favour in either England or America. The continuous kiln has been installed in several American plants and in the matter of fuel consumption, it is probably the best.

The rotary kiln is now most favoured one and is essentially a steel cylinder of 5 to 15 feet in diameter and its length for the dry process is 60-250 ft. while that for wet process is 80-265 ft. generally. .This cylinder is set in a slightly inclined position, the inclination being approximately ½ inch to the foot. The kiln is lined, except near the upper end, with very resistant fire brick, to withstand both the high temperature and the destructive action of the molten clinker.

The cement mixture is fed at the upper end of the kiln, while fuel (which may be either powdered coal, oil or gas) is injected at its lower end. The kiln which rests upon geared bearings, is slowly revolved about its axis. This revolution, in connection with the inclination at which the cylinder is set, gradually carries the cement mixture to the lower end of the kiln. In the course of its journey intense heat generated by the burning fuel first drives off the water and carbon dioxide from the mixture and then causes the lime, silica, alumina and iron to combine chemically to form the partially fused mass known as "cement clinker." This "clinker" drops out of the lower end of the kiln, is cooled and sent to the grinding mills. Most specifications now require at least 90% to pass through a 100-mesh sieve. In some cases 92 or even 95% is recommended. For clinker grinding the following equipments are necessary.

3 170 ft. Kilns—1600 Barrels.
3 Rotary coolers.
2 Kominuters.
2 Smidth tube mills.

EFFECTS OF GYPSUM ETC.

The high lined clinker now produced in the rotary process is naturally very quick-setting. In order to retard its set sufficiently to pass commercial requirements, calcium sulphate in the form of gypsum or plaster is now universally employed. This substance added upto 3% retards the set of cement proportionately and also increases somewhat its tensile strength in short time tests. In larger quantities its retarding influence becomes less and finally negative, and what is more a decided weakening of the cement is noticeable.

CONCLUSION.

Though the process by which Portland cement is manufactured is simple in essentials a very complete equipment is required to secure cheap and efficient production. The machinery is both heavy and expensive, and an intricate system of mechanical conveyors is necessary to carry the materials from stage to stage of the process. But, as compared with other important industries in India, the machinery is not very elaborate, and does not require a great amount of skilled

supervision. The employment of expensive skilled labourers imported from abroad is therefore necessary only to a small extent.

BLENDING OF PERFUMES.

THE blending of perfumes is a recognised art which requires intimate familiarity not only with the chemical and physical properties of each essential oil, gum, resin balsam, and animal secretion, producing an agreeable and enticing odour, but with the modifying, or perhaps destructive, influence of each upon the other as they are compounded. The study of these properties by actual experiment and the harmonious blending of the various bodies in different proportions to produce different results, together with the preparation of the raw material, notably alcoholic extracts, in which condition all gums and animal odours, as well as the more expensive synthetic compounds and natural oils are used, requires a sum of knowledge and experience amply sufficient to give rise to the special art of the perfumer.

The perfume, after having been elaborated, must again be studied in connection with the article to be perfumed or as is commonly the case, the article to be perfumed determines the character of the perfume used. The entire art is one of ceaseless experiment made more exacting by the popular demand for novelties. When prepared for direct sale as a perfume, the article consists of a volatile vehicle, commonly pure alcohol, diluted in varying proportions with water, in which is dissolved the odour-bearing body. The latter is usually a mixture of bodies combined in such proportions as to most fully reproduce the scent of flavour of a particular flower or fruit, or to produce any distinctive odour, the modifiers, and the fixer. It is impossible to make any rational classification of odours. Rumner has attempted this in the following table in so far as he has grouped similar odours into a single class represented by a typical odour. The table is not complete, but possesses some value in suggestion in the study of odours.

Class		Type.	Odours of the same class.
Rose	--	The rose	Geranium, eglantine, palissander.
Jasmine	--	The Jasmine	Lily of the valley, ylang-ylang.
Orange	--	Orange-flower, neroli	Acacia, syringa, orange-leaf.
Tuberose	--	Tuberose	Lily, jonquil, narcissus, hyacinth.
Violet	--	Violet	Cassis, irris, miguonette.
Balsamic	--	Vanilla	Balsams of Peru and Tolu, benzoin, storax, tonka bean, heliotrope.
Spicy	--	Cinnamon	Nutmeg, mace, allspice.
Caryophyllacious	--	Clove	Pink.
Camphor	--	Camphor	Rosemary, patchouli.
Sandal	--	Sandalwood	Vetivert, cedar.
Citrine	--	Citron	Orange ; bergamot, lime fruit.
Lavender	--	Lavender	Aspie, thyme, marjoram.
Mint	--	Peppermint	Wildmint, basil sage.
Anise	--	Anise	Aniseed, caraway, dill, fennel, coriander.
Almond	--	Bitter almonds	Laurel, nut, mirbane.
Musk	--	Musk	Civet, musk-seed, musk-plant.
Amber	--	Ambergris	
Fruit	--	Pear	Apple, pineapple, quince.

By a "modifier", is understood any additional odour or odours used to soften, temper, or mellow the distinctive perfume and is variable in character and proportion as are the individual tastes of perfumers. Thus the oils of cedarwood, cassia, lavender, rosemary, thyme, caraway, citronella, eucalyptus, etc., may be used to modify the odour of safrol, which constitutes the base of many perfume mixtures for laundry soap; whether the odour of the latter will be the distinctive odour depends upon the number, character and proportions of the modifiers.

By a "fixer" or "binder" is understood anybody or mixture of bodies, commonly used as alcoholic extracts, represented by ambergris, balsams of peru; tolu, and storax, gum benzoin, orris root, vanilla, civet, glycerin and musks, employed to equalize the different rates of evaporation of different perfumes, Glycerine has been recommended to the extent of 4 per cent. of the alcoholic solution to retard the evaporation of readily volatile bodies. When the fixer possesses a characteristic odour, as do all the others mentioned, it assumes the function of a modifier as well. Musk and civet in common with others mentioned possess in a high degree this property of harmonizing the different degrees of volatility of different perfumes whereby the liberation of the odours of the ingredients becomes more simultaneous and less of a successive separation. This property is manifested by such small proportions that the characteristic odour of the fixer may not be discernible, yet the body and permanence of the combined odour are increased.

Tinctures (infusions) of the fixers are obtained by trituration of the raw material with alcohol, the odours of which develop greatly on ageing. With musk, exhaustion of the strength of the pod and the development of the odour are aided by the addition of a small proportion of carbonate of potash. The following is the strength of the more important tinctures as they are commonly purchased:—

Tincture.	Proportion.
Ambergis	4 oz. to 1 gal.
Civet	4 oz. to 1 gal.
Gum benzoin	2 lbs. to 1 gal.
Musk	4 oz. to 1 gal.
Orris-root	6 lbs. to 1 gal.
Vanilla	1 lb. to 1 gal.

Fixers may also constitute the base of a perfume mixture and those properties which millitate against their separate use be counteracted by the addition of suitable modifiers. Fixers possess property of persistence of odour arising from the exceptionally infinitesimal size of the particles separated in evaporation. When the characteristic perfume is sweet, an aromatic fixer may be used, as cloves, patchouli, vetivert, sandalwood, almond, vanilla, verbena, or ylang-ylang; where it is aromatic, tincture of storax, musk, civet, ambergris, or musk-seed may be used, the proportions varying with the preponderance of the typical scent desired.

Synthetic chemistry has supplied the perfumer with a large and increasing number of artificial odours which, while not always duplicating the natural source and intensity and delicacy, possess the advantage of greater uniformity of composition and lower cost. In addition to those already mentioned are benzyl cinnamate with the odour of balsam of Peru; bornyl acetate with the odour of fir-trees; cinnamyl alcohol with the odour of hyacinths; salicylic aldehyde with the odour of meadow sweet; geraniol (rhodinol) with the odour of rose; geranyl acetate with the odour of lavender; and many other artificial compounds and secret mixtures with aromas duplicating many natural odours, particularly those of flowers, fruits and plants.

MOTTLED SOAPS.

GENUINE mottled soaps are generally prepared from low grade tallow, bone grease, or kitchen grease, with a cheap quality caustic soda. The impurities from the raw materials produce the mottling.

The mottled soaps as a general rule are made by the boiling process, being pasted, grained and then boiled with strong lye; when the saponification is found to be complete, the boiling is continued until the soap is just sufficiently open to mottle properly on cooling, this being a point which can only be determined by practical experience. In order to determine whether the soap is in proper condition, take a sample on a good-sized wooden paddle. This paddle should remain liquid on the inside for 5 minutes. When the sample is coated, the mottle of the soap should show, otherwise it will not mottle in the frame. When the right condition is reached, the soap is allowed to rest for an hour or two and then quickly run into wooden frames. This mixes the bottom soap at the bottom of the pan with that at the top and renders the mass homogeneous. For good results the frames should be covered with blanket in order to ensure slow cooling.

Mottling effect is however, often made by artificial means. Generally copperas, ultramarine, or manganese dioxide are used to produce the mottle according to the colour of the mottle required. The ultramarine will produce a blue mottle while manganese dioxide, vermillion and copperas will yield grey, red and green mottles respectively.

TWO KINDS

There are two kinds of mottled soaps known. One has a faint grey mottle scattered through its substance while the other has a prominent mottle or grain of a blue, red, or other colour. We will deal with former type first.

The fats and alkalies used in this preparation are generally contaminated with earthy matters and metallic impurities, these acting upon the fats formed by the alkali.

To produce mottled soap with a good grain requires some experience in soap-boiling. The method usually followed is to make a soap from tallow or bleached palm oil, using low grades of caustic and adding it in large excess. The soap is well boiled, and then it is boiled down with some lye until it begins to curd out; it is at once run into the frames, and these are covered over with cloths to keep in the heat. During the cooling the metallic soaps tend to aggregate together and so produce the mottle. One of the chief arts in making a mottled soap lies in the boiling; if boiled too long it sets too quickly and there is no time for the mottling to form properly, while if not boiled long enough, it is apt to contain an excess of lye, and the mottling settles out too quickly.

Properly filled mottled* soap should test around 45 per cent. total fatty acids and 44 to 45 per cent. of moisture.

One most frequently resorted method is to use two crutchers. One crutcher contains a full boiled settled soap, fresh from the kettle and the other contains the same soap to which the required amount of blue or red colour has been added. A trough from the outlet of the first crutcher empties into the frame. The second crutcher containing the blue soap also has a trough which discharges directly into the first trough close to the outlet of the first crutcher. Thus the soap from the first crutcher, is mixed with the blue or red soap from the second crutcher as they flow into the frame. They are further mixed with a short-handled wide pronged rake.

BLUE MOTTLED SOAP

At first soap is prepared from tallow and palm-kernel oil or coconut oil with considerable excess of caustic soda lye. The soap is afterwards removed to a second pan and for every 1,000 lbs. soap are added 250 lbs. of silicate of soda solution, the whole being thoroughly incorporated by boiling until the proper condition of mottling has been reached. This can be determined only by experience, the colouring matter, ultra-marine blue, worked up into a thin paste with water, is then slowly sprinkled over the surface of the boiling soap until the full quantity has been introduced; the amount of ultra-marine blue to the portion of soap varies from 5 to 10 lbs. If the soap is in too liquid a state the colouring matter is apt to permeate the entire mass giving it blue tint throughout, and the desired mottled appearance will not be attained. When properly conducted the blue pigment shows in the soap in blue patches, which appear in strong contrast to the white ground of the soap, giving it a pleasing appearance to the eye.

Coconut oil	10 seers.
Cotton seed oil or low grade tallow	15 ,,
Caustic soda lye40°Be	12½ ,,
Silicate of soda	1¼ ,,
Water	1 seer.
Soda ash	1 ,,
Ultramarine	q.s.

Boil the oils with caustic lye. When the saponification has been completed add liquoring materials consisting largely of silicate of soda solution, together with soda ash and brine. The soap should be distinctly tested, if found to be in a suitable condition for adding the colouring matter add ultramarine in the proportion of 3 to 3½ lbs. per ton. This may be either suspended in a small quantity of water or mixed up with a little of the soap, and sprinkled over the contents of the pan. The soap is then further boiled up until the colour is thoroughly distributed when it is run into wooden frames, and the frames are left undisturbed to allow the soap to cool slowly.

The ultramarine is often worked up into a thinnish paste with water and is then sprinkled over the surface of the boiling soap a little at a time until the full quantity is added.

GREY MOTTLE.

Proceed in the same way and colour with powdered oxide of manganese, from 1 to 3 lbs. to the ton, introduced in the same way as above.

RED MOTTLE.

Same as above; only colour with vermilion.

MAKING GRANULES FOR COMPRESSED TABLES

MOST materials to be compressed require some simple treatment to insure proper operation in the compressing machines. The process, or treatment involved, changes the finely powdered ingredients into free-flowing granules similar to sand which, when compressed, will adhere to form the finished tablets. This procedure is called "Granulating." Another reason for this operation is that most tablet machines measure the material volumetrically and therefore, unless the granulation is quite uniform and in a free-flowing state, tablets of equal weight and accurate dosage cannot be produced.

Before preparing a tablet granulation it is advisable to study the chemical properties of the ingredients and also the physical caracteristics desired. For example,

1. Are the ingredients compatible or incompatible in the presence of moisture?

2. Are hard, medium or soft tablets desired?
3. Will they be marketed as uncoated or *coated tablets?*
4. If the materials are moistened by water or a binding solution to facilitate adhesion, will the ingredients withstand moderate drying temperatures without deterioration?—If not, then a different method such as the "Slugging" or double-compression method must be used.
5. Into what type of climate are the tablets to be sent? Will they remain stable under these conditions?

After analyzing these requirements the prospective tablet maker can then decide on the most suitable method of granulation.

A good granulation is one that has—

1. Particles of uniform size
2. A moderate amount of fine particles
3. Granules which will compress into a firm tablet without excessive pressure and which will permit easy ejection of the finished tablet from the die after compression.

A certain percentage of fine particles is necessary to fill in the spaces between the granules in order to produce a tablet of smooth appearance. Generally 10-20% "fines" is satisfactory for this purpose, but too many fines will cause trouble, such as landing in the die, "capping" or "lamination."

There are two distinct methods of preparing a granulation, namely,

1. The *wet granulating process* in which the binder is added in the form of a solution.
2. The *dry granulating process* known as "Slugging."

We will only consider here the wet granulating process, as this is the older of the two and probably is in more general use.

The Wet Process of tablet manufacture may be divided into eight distinct operations, namely:

1. Preparing the granulating solution or binder
2. Weighing and mixing the separate ingredients
3. Granulating (moistening powdered ingredients) with water or a binding agent in solution
4. Screening (forcing the moistened materials through a screen of proper mesh to form granules which will dry readily)
5. Drying granulation
6. Screening after drying to reduce the dried granulation to final and proper size most suitable for compressing
7. Lubricating (coating granules with lubricating material).
8. Compressing into the finished tablets.

Certain of these steps can be combined or eliminated depending on the materials and the individual formula. If the prospective tablet maker studies each step, and has a clear understanding of the reason for each operation, gratifying results should be obtained.

OPERATION I.

The first operation in the wet granulating process should be the preparation of the granulating solution or binder. This is not only a logical step, but timesaving as well and one which will be readily appreciated after having made a few batches of tablets.

CHOICE OF BINDER OR GRANULATING SOLUTION

Generally speaking the most widely used binders in use to-day are those given

below, which are listed in order of their respective strength or binding properties.

1. Glucose (Corn Syrup)
2. Gum Acacia
3. Gelatin
4. Syrup (Cane Sugar)
5. Starch Paste
6. Water
7. Alcohol.

A binder in solution is considerably more effective than the same amount of material in powder form, and in this list it must be borne in mind that the strength of each solution itself may be changed by modifying the proportions of binder to the amount of water used.

There are many other binders each possessing special properties, but we believe that most pharmaceutical tablets can be adequately and most satisfactorily prepared by use of those solutions mentioned above.

If the ingredients are light and fluffy, do not possess any cohesive properties or are greasy, a strong binder is recommended. It is well to bear in mind that good tablets should contain the least amount of binder consistent with the production of firm tablets. In general, the smaller the percentage of the binder in the finished tablets the faster will be disintegration.

In order that the beginner may judge the respective binding properties of the various granulating agents, it is a good idea to prepare small batches of 100-200 tablets, and use a weaker binder first. If that particular binder does not produce satisfactory tablets, increase the amount of binder or the strength of the solution, or select a stronger binding agent and continue by this produce until the desired results are obtained.

PREPARATION OF GRANULATING SOLUTION

Most binders are solid materials, but as previously stated, their effectiveness is greatly increased by using them in a proper solution. Generally speaking, a binder in solution is at least twice as effective as the same binder when used in the dry form. Solutions of binders also permit far better distribution throughout the mixture.

As it is the purpose of this text to guide the beginner through the various phases of tablet manufacture, we will give instructions for the preparation of granulating solutions as weight-in-weight. This is accomplished by taking a given weight of dry binder and making up to a given weight with water. Typical solutions and instructions for their preparation are explained later. This simplifies the preparation of small amounts of these solutions and the amount of solid binder in the finished tablet can readily be calculated. This is important in determining the final weight of the tablet.

GLUCOSE (OR CORN SYRUP) SOLUTION

Generally 25% or 50 per cent. solution is used. It is prepared as follows:

GLUCOSE 25% SOLUTION

	parts.
Glucose (Corn Syrup)	25
Water, a sufficient quantity to make	100

GLUCOSE—50% SOLUTION

Glucose (Corn Syrup)	50
Water, a sufficient quantity to make	100

Weigh out glucose and add sufficient hot water to dissolve. Stir well. Make to weight. Strain through muslin if necessary. Glucose, being somewhat hygroscopic, is not recommended where

the tablets are subject to humid conditions.

GUM ACACIA SOLUTION OR MUCILAGE

Usually a 10 or 20% solution is used. It is best prepared as follows, using granular Gum Acacia.

GUM ACACIA—10% SOLUTION.

	parts.
Gum Acacia	10
Water a sufficient quantity to make	100

Place the acacia in a beaker or other suitable container and add quickly at least an equal amount of warm water. Stir rapidly for several minutes then set aside, agitating at frequent intervals until dissolved. Heating on a steam bath or placing the container in a pan of hot water will hasten solution. Make up to final weight. Stor well and strain through fine muslin to remove foreign matter.

GUM ACACIA 20% SOLUTION.

Gum Acacia	20 parts.
Water, a sufficient quantity to make	100 ,,

Procedure same as above

Note.—Solution of Gum Acacia should be freshly prepared, as they become sour on keeping Sodium Benzoate 1/10 of 1% may be added as a preservative, but it is better to prepare this solution as it is needed.

GELATIN SOLUTION

This is a widely used and very satisfactory binder. The usual mixtures are 10 per cent or 20 per cent. solution.

GELATIN—10% SOLUTION

Gelatin	10 parts.
Water, a sufficient quantity to make	100 ,,

GELATIN—10% SOLUTION

Gelatin	20 parts.
Water, a sufficient quantity to make	100 ,,

Use a good quality granular gelatin. Cover with water and allow to stand or soak for several hours. Then heat gently with frequent agitation in a water bath or steam kettle until thoroughly dissolved. Add sufficient water to make up to final weight. Stir well and finally strain through muslin.

Note:—Gelatin solutions must be used while warm, otherwise they will solidify.

CANE SUGAR SYRUP

Usually a heavy solution is used.

Sugar (Cane Sugar)	2 parts.
Water	1 part.

Dissolve the granulated sugar in water. Heat slowly until it boils. Allow to boil for about one minute. Allow to cool. Make up to weight and strain through muslin.

CORN STARCH PASTE

A general purpose formula is as follows, although weaker or stronger solutions may be used.

Corn Starch	1 part
Water, a sufficient quantity to make	16 parts (16 ozs.)

Place starch in suitable container, slowly add all the water, stirring constantly to avoid lumps. Heat slowly while stirring until it just boils. Remove from heat, allow to cool somewhat. It is then ready for use.

PHARMACY INTERNATIONAL

Pharmaceutical Recipes

LIQUID EXTRACT OF MALT WITH HYPOPHOSPHITES

Calcium hypophosphites	5	grams.
Sodium hypophosphite	5	„
Distilled water	50	c. c.
Liquid extract of malt sufficient to produce	1000	c. c.

Dissolve the hypophosphites in the distilled water and mix with liquid extract of malt.

Dose: 4 to 16 c. c. or 1 to 4 fl. dr.

BORIC EYE OINTMENT

Boric acid, in very fine powder	20	gr.
Simple eye ointment	480	„

Triturate the boric acid with a portion of the melted simple eye ointment until smooth and gradually add the remainder of the melted basis. Triturate continuously until the product is cold.

To prepare simple eye ointment proceed as follows:—

Wool fat	50	gr.
Yellow soft paraffin	450	„

Melt together, filter while hot through coarse filter paper and sterilise by heating at 150°F for one hour.

FRUIT SALT.

Sodium bicarbonate	25	p. c.
Citric acid	27	„
Sodium citrate	41	„

Dry the ingredients separately to drive away their moisture and then cool to room temperature in closed vessels. After this mix in the proportions stated and keep in well-stoppered bottles.

GLYCERINE SUPOSITORIES

Glycerine	30	grains.
Soda carbonate	0.5	„
Stearic acid	2.0	„
Water	5	mills.

Dissolve the soda carbonate in the water and add it to the glycerine contained in a suitable vessel placed in a water bath in such a way that the vessel is well down in the boiling water and its contents protected as much as possible from the steam of the bath. Add the steairc acid and heat the mixture for 15 minutes or until the carbon dioxide ceases to be evolved, and the liquid is clear. Then pour the melted mass into suitable moulds, remove the suppositories when they are completely cold, and preserve them in tightly stoppered glass vessels in a cool place.

SYRUP FERRI IODIDE.

Iron, wire cut into small pieces	12.5	grms.
Iodine	4.5	„
Diluted Hypophosphorous acid	20.0	c. c.
Sugar	575.0	grms.
Distilled water	q. s.	

Introduce the iron and iodine into a flask of thin glass and add to it 150 c.c. of distilled water. Shake the mixture occasionally. check the reaction by placing the flask in cold water, and when the solution has acquired a greenish colour and has lost the odour of iodine, heat it to boiling; and add at once 50 grams of the sugar. When this has dissolved, filter the solution into the remainder of the sugar contained in a porcelain dish. Rinse the flask and iron wire with 125 c.c. of distilled water and pass the washings through the filter into the sugar. Stir the mixture with a glass rod, heating the liquid on a water bath until complete solution is effected and having passed the syrup through a clean muslin strainer into a tared bottle, add the diluted hypophosphorous acid and sufficient distilled water too make the prroduct weigh 1000 grams.

TONIC FOR BALDHEAD.

Sweet oil	8	oz.
Almond oil	8	„
Oil of origanum	1	dr.
Oil of lavender	1	„

Mix all together. Apply daily over the head with a soft brush.

ANTI-RHEUMATIC LINIMENT.

Capsicum	1	oz.
Oil of turpentine	1	pint.
Menthol	1	oz.
Oil of Origanum	3	dr.
Oil of Gultheria	1	oz.
Oil of camphor essence	1	pint.

Macerate the capsicum with the turpentine oil and then add the other ingredients one by one.

ECZEMA OINTMENT.

Lanolin	200	oz.
Petrolatum	200	„
Beeswax	50	„
Phenol	5	„
Camphor	10	„
Oil of eucalptus	50	„
Salicylic acid	10	„
Perfume to suit		q.s.

Recipes for Small Manufacturers

LACQUER FOR TINS.

Nitrocellulose	18	oz.
Dibutyl phthalate	4	oz.
Ethyl alcohol	9	oz.
Methanol	9	oz.
Acetone	36	oz.
Butyl Acetate	24	oz.
Spirit soluble aniline dye	1	oz.

Mix in a stoppered bottle. Keep aside for a day and then strain through cloth and bottle.

DANDRUFF LOTION.

Resorcin	1	dr.
Castor oil	2	,,
Geranium Oil	10	drops.
Lavender Oil	10	,,
Alcohol (45 per cent.) to make	8	oz.

Mix thoroughly.

MOUTH WASH POWDER.

Borax	1	oz.
Thymol	1	gr.
Menthol	1	,,
Methyl salicylate	5	mins.
Eucalyptol	5	gr.
Clove oil	2	mins.

Mix the flavours with a little alcohol and spray in the borax powder Allow the alcohol to evaporate and pack the powder at once in glass bottles.

HAIR TONIC.

Tincture of cantharidin	6	oz.
Quinine hydrochloride	1	,,
Tincture of capsicum	2	,,
Glycerin	3	,,
Bay rum	60	lbs.

Tincture *of cudbear sufficient to colour.* Mix.

HONEYED GINGER.

This is a kind of preserved ginger which can be prepared by boiling young, tender, carefully selected decorticated rhizomes in water until pulp becomes softer The water is then thrown off and the ginger is put into honey totally immersed and packed in well stoppered bottles for future use

TRANSFERRING PHOTOS TO GLASS.

Where it is desired to transfer photos to glass for display purposes the following process may be easily utilized and with a little practice should give excellent results. The simple, using glycerin, preparation, required can be made up without difficulty.

Glycerin	½	oz.
Gelatin	4	,,
Water	8	,,
Alcohol	3	,,

Dissolve the gelatin in the water with gentle heat, add the glycerin and pour the mixture slowly, with thorough mixing into the alcohol.

Thoroughly cleaned glass and unmounted photos, without printing or writing on the backs, must be used. Flow the solution in the glass and place the photo, face down, on the glass and pour on more of the solution. Excess should be removed to prevent bubble formation. Allow to dry, the photograph when it is dry will be transparent and may be coloured, if desired with oil paints.

CHARCOAL BRIQUETTES.

Powdered charcoal is mixed in following proportion and pressed and dried.

Charcoal	1000	Kilogram.
Glue	20	,,
Sodium nitrate	7	,,
Gelatin, Bone	½	,,
Water	105	litre.

MICA PAINTS

The preparation is of very simple character. The necessary quantity of the medium is poured upon the flakes, and thoroughly mixed with a spatula. The paint is then ready for use.

As a standard composition, the mediums for which may be used linseed oil (boiled), fatty varnishes,, water-proof varnishes, bronzing liquid, or paints in general, the proportions suggested are 200 grams of mica flakes for 1 kilogram of medium. Where the medium is a cellulose lacquer, the proportions are 100-120 grams. of mica flakes for 1 kilogram. of medium.

In order to protect and to increase the durability of any painting slightly increase the amount of colouring matter to preserve the same shade of colour, which the flakes have a tendency to lighten to a certain degree. A suitable proportion will be an additional 50-100 grams of mica flakes per kg. of prepared paint.

The paints should not be prepared for too long a time in advance; it is preferable to make the mixtures shortly before using. Application can be made by brush or with the spraying gun.

In the Field of Invention

IMPROVED SOLVENT EXTRACTION

The present considerable demand for vegetable oil recovery has focussed further on improved extraction plants, among them the extraction process, which has been very highly developed. The technical and production resources of the London Aluminium Co., Ltd., are now being applied to the construction and development of Merz solvent extraction and edible oil refining plants.

In the majority of extraction plants the extractor and still are separate units, in the Merz design they are in one vessel, separated by an internal head the advantage of this lies in the utilisation of the heat of the solvent vapours emanating from the still for the purpose of warming the material in the extractor.

By means of special cocks connecting the still with the extractor it is possible to force the solvent vapours through the material to be extracted, thus not only achieving a temperature in the extractor nearly as high as the boiling point of the solvent, but also removing any excessive moisture contained in the raw material.

During the warming up of the extractor solvent vapours are condensed within the raw material and the concentrated solutions formed drop back into the still.

An important feature of the condenser design is the achievement of quick extraction by the condensed solvent being returned hot into the extractor without losses.

A point of interest is that the extractor is fed with solvent by gravity, no pumps being required. Once the valves are set, the process is nearly fully automatic and needs little supervision.

For finely ground and pulverised materials straight forward extraction has to be replaced by a decanting process. The plant for this purpose consists of a decanter, extractor, filter, pump, still condenser automatic separator, solvent tank and dust catcher.

—Chemical Age.

BRITAIN'S CAPITAL PROJECTS

Following is an illustration of Generating station equipment being made at Midlands factory of the General Electric Company. Other equipment of this type is being made for the Sindhri project in India.



Formulas, Processes & Answers

ALUM MANUFACTURE.

2308 N J R, Patna City—Desires to learn a process of preparing alum.

Alum is a double sulphate of aluminium and potassium and is mainly manufactured from bauxite For this purpose bauxite in lumps, which is first of all calcined in a reverberatory furnace until it becomes friable, great care being taken that the heat be not sufficient to induce it, which would destroy its subsequent solubility is next reduced to fine powder, sifted and introduced into the cast-iron boiler lined internally with lead and stoneware which contains about 45 per cent. of its weight of sulphuric acid (sp. gr. 1.45).

CONVERSION OF BAUXITE TO SULPHATE.

On applying heat a violent action soon takes place and the pressure inside the boiler sometimes rises to 4 atmospheres. After ten or fifteen minutes the action is completed, and the pressure gradually sinks. By opening a valve the pressure is reduced to atmospheric, the manhole is opened, the pasty mass is diluted with water until a concentration of 29°—31°Be is attained and the liquid mass runs out into tall settling tanks After four days the clear liquid is decanted off and evaporated until the concentration has reached 40°Be. The concentrated aluminium solution is now run into a large tank, where it is allowed to become quite cold.

The potassic or ammoniacal salt is now ready to be added. To make potash alum, either the neutral sulphate or the chloride of potassium can be used. In making ammonia alum, ammonium sulphate is used. This combines with the sulphate of aluminium dissolved in the liquor and forms the double sulphate, alum, which being only slightly soluble in cold water is thrown down in crystals.

Before adding potassium of ammonium salts a test is to be made to ascertain the exact percentage of sulphate of aluminium in the tank. Usually 174 parts by weight of potassium sulphate or 114 parts of ammonium sulphate will be required for 342 parts of aluminium sulphate. This is dissolved in the smallest possible quantity of hot water added gradually to the liquor in the tank, and two mixed up together by vigorous stirring. As soon as they have properly combined, the alum is deposited in small crystals all round the walls and bottom of the tank After a day or two the mother liquor is drained off, the crystals are washed with as small a quantity of cold water as possible to remove any adhering impurities. Some alum is necessarily dissolved at the same time, but that can be again recovered, so that it is not wasted. The alum crystals are again dissolved in hot water and crystallised therefrom, after first making a solution of sp. gr. 1.5.

SALTPETERE.

The impure saltpetre earth collected is lixiviated in earthenware dishes or wooden boxes or in pits dug in the ground and made tight by a clay. The liquor is concentrated in iron pots or sometimes only by solar heat and a crop of every crude saltpetre is obtained.

Before submitting the liquor to the process of concentration, it is thoroughly mixed with wood ashes, which generally contains carbonate of potassium. The advantage of adding the wood ash is to concert the whole of calcium and magnesium nitrates present in the crude product into insoluble carbonates. The solid residue is then separated either by filtration or by decantation and the liquor thus obtained from the clarified liquor by slow evaporation in earthenware pots is the saltpetre of commerce containing 45 to 70 per cent. of potassium nitrate.

FACE POWDER.

2363 T.T., Rangoon—Desires to know a good formula of face powder.

Talc powder	20	lbs.
Boric acid	2½	„
Magnesium stearate	½	lb.
Light magnesium carbonate	1½	lbs.
Violet	7	oz.
Heliotropin	2	„
Musk Xylene	1	„

Mix the powders. Then spray the essential oil mixture and pass through a fine sieve for several times. Finally pack.

CURRY POWDER.

2396 K.K.G., Calcutta—Wishes to have a recipe of curry powder.

Coriander seed	48	parts.
Ginger	8	„
Turmeric	24	„
Cinnamon	16	„
Cumin seed	8	„
Fenugreek seed	4	„
Cayenne powder	3	„
Pimento	2	„
Black pepper	1	part.
Long pepper	1	„
Cloves	1	„
Nutmeg	1	„

Reduce the ingredients into fine powder and mix thoroughly.

WHITE HARD SPIRIT VARNISH.

[illegible] L.T., Sultanganj—Wishes to have good recipes of white hard spirit varnish.

These varnishes are made by dissolving spirit soluble Manila gums in alcohol or methylated spirit, usually about 3 lbs. of Manilla gums to 1 gallon of alcohol being the proportion adopted. They are clear, transparent varnishes and are largely used as paper varnishes.

For making spirit Manila varnishes only those copal gums should be selected which will readily dissolve to a clear solution, free from slimy or stringy quantities. They dry off very quickly with a high lustre.

Brown varnish is made in a similar manner but a small percentage of Bismarck brown is added to give the requisite colour.

HAIR DYE POWDER.

2484 L.C.W., Bombay—Wants to have a formula of hair dye powder.

Tartaric acid (powder)	2	oz.
Barium peroxide	4	„
Paraphenylenediamine	2	„

Mix the above ingredients and keep the mixture in well-corked bottles. This powder is to be made into a thin paste with water and applied to the hair (previously freed from oils with soap and water, and dried), by means of a sponge or brush or the fingers. Continue rubbing with it the roots of hair and pass a comb for some time occasionally adding a few drops of hot water to preserve the whole moist. Now conclude by washing with soap and hot water solution.

SOLE PAINT.

2477 S.S.S., Agra City—Wishes to have a formula of preparing sole paint.

Red oxide of iron	2½	parts.
Kaolin	13	„
Yellow ochre	10	„
Middle chrome yellow	3	„
Gum acacia	3	„
Water	60	„
Creosote oil	2	„

First make the mucilage of acacia using a portion of the water. Then incorporate the pigments in the mucilage and thinned down using the rest of water. Lastly add the creosote oil as preservative.

SYRUP HYPOPHOSPHITE OF LIME

2516 P.R.A., Chopra—Desires to know the formula of preparing syrup hypophosphite of lime.

Calcium hypophosphite	18.3	grms.
Hypophosphorous acid	2.5	„
Sucrose	800.0	c. c.

Dissolve the calcium hypophosphite with the aid of the hypophosphorous acid in 460 c. c. of distilled water, filter the solution, and the sucrose to the filtrate, and after this had been dissolved by agitation, add sufficient distilled water to make the product measure 1000 c. c.

WATERPROOF DRAWING INK.

2517 B.N.K., Brajrajnagar—Wishes to have a good formula of preparing waterproof dawing ink.

Boil 8 oz. shellac in a solution of borax made by dissolving 2 oz. of borax in 72 oz. of water; then strain. Grind colours with such pigments as vermilion, indigo, etc. The small quantities of the colour may be rubbed in a mortar. These inks can be used for drawing. For transparent colours use aniline dyes, water soluble.

CLEANING WASTE FILMS.

2562 N.P., Saharanpur—Wants to have a process of cleaning waste films.

To clean waste films make a hot solution of sodium carbonate and immerse in it the waste films to be cleaned. Continue heating for a few minutes and then allow the whole to cool. After this rub or scrape off the films with a blunt knife. Finally wash the films with water.

DYEING BRISTLE IN BLACK COLOUR.

First wash the bristle with dilute soap solution to remove from its surface the dust and dirt. Then immerse it for 2 or 3 days in a bath, at first hot of logwood 8 parts, and ferrous sulphate or acetate of iron 1 part. Finally take it out and dry.

TIN PRINTINNG.

2581 H.M.S., Baroda—Desires to know a process of tin printing.

The modern method of printing upon tinned plates is an application of offset printing. The printing machines may belong to either the flat-bed or the rotary type, but they are built for this special purpose and have their own characteristics. The tinned plate, does not actually come in contact with the printing surface; but as it is carried round with the cylinder into which it is fed, it receives an offset impression from a rubber blanket fixed upon a second cylinder, which has already taken a direct print from the printing surface. As the plates are printed they are arranged in racks and kept aside to dry or they may be put into a stone for forced drying.

Before printing, each plate should be thoroughly rubbed on both sides with a duster to remove dirt, grease, etc., which may perchance have got upon it, and which, if left, would prevent the ink from printing. Rough edges must also be smoothed, as otherwise the rubber blanket would soon be damaged.

The method usually adopted is the same as that of printing paper. The white would be done first, and would cover up all parts except those required to appear as gold and silver, or any parts in which a colour is required to appear with a lustre. Of course, only transparent yellow lacquer is usually printed after the white, it produces a nice strong buff where it falls upon the white, and a bright gold where it comes upon the bare tin. It may, however, be had of various shades to suit special requirements. It helps to give depth of colour and brilliancy to solid reds and other colours. It is an important matter for the artist when drawing the design to take full advantage of the light colours. The black printing would come next, followed by the red and the blue. After the work has dried, the plates are varnished and then stoved, after which they are ready for the tin box workers.

As with ordinary offset printing the rubber blanket will require to be washed several times during the day. This should be done with a very volatile liquid such as solvent naphtha spirits of turpentine, or benzoline, and it should be immediately afterwards dusted over with fine flour sulphur This treatment will impart to the rubber a fine printing surface.

All designs to be printed on tin should be specially lithographed by an artist with experience of tin plate work. Type matter must be reversed.

DEVELOPING NEGATIVE PLATE

2588 C.K.U., Rabkavi—Wants to have a process of developing fixing washing negative plate.

(A)	Pyrogallic acid	55	gr.
	Metol	45	,,
	Potassium metabisulphite	120	,,
	Potassium bromide	15	,,
	Distilled water to produce	20	oz.
(B)	Sodium carbonate	4	,,
	Distilled water to make	20	,,

For use take equal parts of A and B.

When any of the above developers is prepared the exposed plate is put in a porcelain dish with coated side upwards and then the previously made developer is poured in it in one quick sweep. If any air bubbles are formed they are broken gently by fingers. Then the dish is rocked from side to side to ensure entire flow of the developer all over the surface of the plate. The brightest parts such as sky and white dresses appear first. Development is continued for 2 or 3 minutes more even after the appearance of the image so as to add density to the negative

FIXING

The process of fixing is the removal of the sensitive salt unacted upon by light, or by the developer, thus rendering the negative unalterable by further action of light. The usual procedure in fixing is to place the negative, coating upwards, in a dish full of hypo solution, technically called the "fixing bath." The solution should be 4 oz. hypo and 20 oz. of distilled water. The dish here also, is to be rocked as was done in developing. While fixing is apparently the simplest of all photographic operations, it is frequently done in an insufficient manner. A negative is not fixed as soon as silver appears to be dissolved and the plate becomes clear.

WASHING

Negatives and prints that have been fixed in hypo must be freed of this substance by washing with water before they can be safely dried; otherwise the permanency of the negative is impaired.

The usual process is to keep the negative in a dish and then water is allowed to trickle over it for an hour. Hypo being of greater specific gravity than water, it follows that as part of the washing water removes hypo from the plate and "paper" it forms a solution denser than plain water and therefore tends to sink to the bottom of the washing vessel.

PRINTING NEGATIVE

In the process of printing the negative is pressed on the sensitive part of the paper with the emulsion side of the negative in contact with a "frame" specially designed for the purpose. The frame is then kept in daylight (but not directly under the sun) until the image on the paper is darker than desired. Thus the photo (positive picture) will be found having black things black and white things white.

NAPHTHOL SOAP

2612 N.D.W., Hubli—Wants to know a formula of preparing naphthol soap.

In making naphthol soap first prepare white soap stock with the following in the usual boiling process :—

Coconut oil	5	parts.
Caustic soda (70°)	1	part.
Water	2	parts.

Dissolve the caustic soda in water and set aside. Then heat the coconut oil in a pan over moderate fire and stir in the caustic soda lye. Add water from time to time to make up the evaporation. Continue heating until the saponification is complete. Then remove the pan from the oven and measure out the soap. Now to

every 100 grams of soap stock thus prepared add 5 grams of B-Naphthol dissolved in 50 c.c. of alcohol.

MONOPLE SOAP

Monople soap may be prepared by heating the sulphonated castor oil with alkali.

270 kilos of castor oil are sulphonated with 60 kilos of concentrated sulphuric acid, and the sulphonated oil is well washed with water and salt solution, and there is obtained 300 kilos of a sulphonic acid; 12.5—13.5 kilos of soda ash dissolved in water are added at ordinary temperatures until the product is neutral and dissolves in water to form a clear solution.

The sodium salt of the sulphonic acid is heated in a boiler until water vapours cease to be evolved. The temperature is raised to 130°C and on cooling a viscoid neutral oil is obtained, which dissolves in water to form an initially clear solution which lathers well. The product is soluble in petroleum spirit, benzene, ether, etc. and in mineral and fatty oils.

OFFICE PASTE

2614 S.M.D., Ambala—Wishes to have recipes of office paste and label varnish.

Potato starch	7	parts.
Dextrine white	3	„
Sodium chloride	9	„
Zinc chloride	4	„
Salicylic acid	1	part.
Water	120	parts.

Mix the starch and dextrine into uniform paste with some cold water. Heat the rest of water to boiling, add salt and zinc chloride, and gradually add starch mixture. Lastly add the salicylic acid.

LABEL VARNISH

Sandarac	3	oz.
Mastic	½	„
Venice turpentine	150	gr.
Spirit	16	oz.

Macerate with repeated stirring until solution is effected, and then filter.

The paper labels are first sized with diluted mucilage, then dried, and then coated with this varnish. Sometimes the labels are coated with collodion to make it waterproof and then varnished.

EXTRACTION OF ROSHAGRASS OIL

2670 S.D.B., Amraoti—Desires to be enlightened with the process of extraction of roshagrass oil.

The oil is obtained by distillation. A wrought iron boiler is fitted over an earthen fire-place and surmounted with a head from which two straight tubes, from five to six feet in length and two inches in diameter, conduct the vapour into a couple of large copper receivers immersed in cold water. At the conclusion of the process the condensed fluid is poured into a large wide-mouthed vessel and permitted to stand for some time, when the oil may be skimmed off the surface with a small spoon.

The plant is cut across when it begins to flower and bound into small bundles or maniples, 250 to 300 of which are placed in the boiler and so much water poured over them as to leave a sufficient space for ebullition. The process occupies about six hours, and there is a succession of attendants so that the charge is repeated about four times every twenty-four hours, and about one seer of oil is thus obtained. In passing through the hands of the traders the oil is largely adulterated with gingelly oil.

After the greater proportion of the water had been strained off, the mixed oil and water is placed in a clear glass bottle, and the hand being held against the mouth, it is inverted. The water is then allowed to gradually escape, and the oil is thus purified. It is at first dirty brown in colour, but clears as it is kept.

CHEWING GUM

2671 R.P.K., Delhi—Wants to have a formula of chewing gum.

Granulated sugar	32	parts.
Glucose	32	„
Water	32	„
Agar-agar	1	part.
Lump white starch	1	„

Soak the agar-agar in cold water before use. Remove and put in a large pan with the water, and dissolve by simmering, then pass through a fine sieve. Next mix starch in a little cold water and put the whole into a large pan, and boil to jelly point, stirring as required.

Then colour, flavour and add tartaric or citric acid to taste. Then run out, and dry in a stove for two days.

REFINING GROUNDNUT OIL

2675 M.L.I., Delhi—Desires to know a good process of refining groundnut oil.

The groundnut oil as expressed from the seed is liable to contain mucilage and albuminous matters, which produce turbidity in the oil. In order to remove these impuritiies filter the oil through a filter press; but before doing so treat the oil with 10 per cent. of its weight of fuller's earth, which should be dehydrated by roasting prior to use. Mix thorougly and then heat the mixture to 100°F, and maintain the temperature constant for about 15 minutes. Lastly filter the oil through filter press. Thus a clear oil is obtained but the odour of the oil is somewhat earthy. To remove this bad odour wash the oil with 1 per cent. solution of brine containing an equal amount of dry sodium bicarbonate.

ELECTRICAL HEATING STOVE.

2693 J.I., Bangalore—Wishes to have a process of making electrical heating stove

When an electric current passes through a conductor, heat is produced, the rate of heating being proportional to the electric power expanded in overcoming the resistance of the conductor.

An electric radiator (heater) is an appliance for converting electrical power into heat, and consists of a resistance of some kind through which a current of electricity may be passed.

In making a good and efficient radiator it is necessary to choose a material having a high specific resistance, and in addition to this it must be a material that will withstand a high temperature for a long time without oxidising or burning away. The best material for this purpose is composed of an alloy of nickel and chromium. This will withstand a red heat for a very long time without oxidising or disintegrating, and heaters which are required to run at a red heat are constructed of this material.

Since the resistance of a coductor is directly proportional to its length and inversely to its cross-sectional area, it follows that we may have two conductors of the same resistance and yet of different sizes, for if both length and cross-sectional area are increased in the same proportion, the resistance will remain the same.

Heaters are generally made up in datachable units called "The Multiple Parabola Bar" because the face of the bar consists of a number of wells of parabolic shape in which the heat generating wire is seated in correct focus, and from each of these wells intense radiant heat is projected. The wire coils are fixed by threading the wire ends through holes in the fireclay bar.

A few second after an electric radiator has been switched on to the supply mains, it attains its maximum temperature, and after that radiates or throws off heat at the same rate that power is supplied to it from the mains.

RUBBER BALLOON STAMPING INK

2705 V.M., Nagpur—Wants to have good formulas of rubber balloon stamping ink.

Only glycerin inks are suitable for stamping rubber goods A typical formula is as follows:—

Methyl violet	2	parts
Wood vinegar	10	,,
Methyl alcohol	10	,,
Glycerin	70	,,
Distilled water	10	,,

Dissolve the methyl violet in the methyl alcohol. Then add the distilled water and vinegar. Lastly add the glycerin.

ARTIFICIAL SAGO.

2732 N.V.F., Madras—Wants to know a process of manufacturing artificial sago.

Artificial sago is generally prepared with highly refined potato starch. The drying is continued until a mass is obtained which, when passed through a screen forms granules which neither stick together not fall to pieces. If this consistency be lacking, it can easily to attained by very little manipulation. If the starch is too dry, a little freshly-washed and still quite wet starch is added until the desired effect is produced; on the other hand, if it be too wet, some perfectly dry starch is added.

The granulating apparatus consists of a screen, the sheet metal bottom of which is pierced with perfectly round holes, the size of which varies from that of a lentil to fine barley groats, according to the grainsize desired.

The dough is placed on this screen and covered by a heavy plate which presses the mass through the holes. Jolting the screen detaches the granules on to an endless band underneath.

The granules are left exposed to the air until so dry that they will not stick together when shaken up in a glass, but form rounded grains and a little dust resulting from mutual friction.

The angular granules are rounded in a rolling drum rotating on a shaft. This drum is turned for 15-20 minutes. The contents are transferred to a large, fine sieve, to remove the dust, and are afterwards classified on a series of super imposed screens of diminishing mesh.

The granules from white opaque masses require further treatment to impart the glossy, translucent appearance characteristic of sago. This treatment is termed glazing or polishing.

Glazing is effected by (partly at least) gelatinising the surface and drying it at the same time. With this object, the granules are spread thinly on iron trays and placed in a box heated to 160-170°F by hot air. Before being admitted into the box, this air is passed over a vessel of boiling water, thus becoming saturated with moisture which then gelatinises the surface of the granules.

When a sample shows that gelatinisation has commenced, the water vessel is removed, and the hot air is passed over the granules until they have become quite dry and hard. If the treatment has been properly carried out, the granules have now a handsome white glazed aspect and are perfectly hard. On being stirred into hot water, they swell up rapidly to perfectly transparent lumps, which will retain their shape, unless the water is boiling hot, because the interior is not yet completely swollen.

To obtain sago with a yellowish tinge, the original wet starch is tinted with a little caramel; or the finished granules are allowed to roll over a sloping plate heated to about 200°F. This browns them superficially, and any yellowish or brownish shade can be obtained by mixing them with white granules.

BLOTTING PAPER.

2734 O.P.S., Kairana—Wishes to know the process of making blotting paper and other formulas.

Absorbency of blottings and similar papers is a capillary phenomenon of sucking liquids into the hollow tubes of the individual fibres so also through the walls or membranes of the cellulosic fibres. If the hollow canals and the pores in the walls are choked up, as is the case in loading and sizing the fibres or with the hydration of pulps or the incomplete removal of the incrusting and other non-cellulose matters in the chemical treatments of the raw material in obtaining cellulosic fibres, they offer no free passage to the liquids or inks through them in proportion to the hindrance caused by the above. Hence a thorough treatment is given to the raw material in obtaining the cellulose for absorbent papers. All the raw materials have not the same capillary phenomenon. The cotton fibres having a thin wall hollow tube and the cork screw appearance leaving more air spaces betwen the fibres form an ideal material for blottings. Old and soft rags as well as cotton wastes are very useful for converting into good blotting paper. The rags or waste cottons should be boiled with 5 to 6 per cent. caustic soda for 4 to 5 hours either in an open boiler or digested in the digestors at 25 lbs. pressure. They are then washed and may or may not be bleached. Since the pulp is to be free the stuff is beaten in the shortest possible time to avoid hydration and to retain the maximum absorbency. The pulp may be coloured with a bluish pink colour. Sometimes the treated rags are retted for 2 or 3 months, before washing and beating. This tenders the fibres. The blottings from this are softer with good absorbency.

Waste paper is also useful for conversion into blotting. For this, it should be boiled with 3 to 4 per cent. of caustic soda for an hour and left in retting tanks for about a week to complete the reaction. By this, not only the sizing materials are removed completely but the fibres become tender. Then the pulp is made as usual and coloured if necessary. Congo red or Imperial red with bluish shade is mostly used for pink blotters.

MARBELIZING WOOD.

The first operation is to coat the surface with a white lacquer primer surfacer. When thoroughly dry, prepare a mixture of glycerin thinned 10% with water. Spatters this mixture on the white lacquered surface with a spray gun that has a spattering nozzle attachment or by some hand process for instance by using a whisk broom. Then use the whisk broom, your finger or a piece of cloth to spread the spattered liquid to the grain effect desired. By various skillful motions and a little care, some wonderful marble patterns can be produced.

The next operation is to spray a light coat of any colour (dark green, for example) according to the colour effect desired. When this coat has dried thoroughly wipe the surface with a rag saturated with water; this operation will remove the glycerin solution and have a wonderful marble pattern effect.

If any other tonings with various colours are desired they should be applied transparently, so as not to disturb the marble grain pattern produced. When thoroughly dry, a finish coat of clear lacquer can be applied.

BLACK ENAMEL CYCLES.

Asphalt	2 lbs.
Boiled linseed oil	1 pint.
Oil of turpentine	4 pints.

Mix the two oils, add the asphalt in small pieces, set aside in a warm place for a week, shaking occasionally then decant the clean fluid.

Benzine may be used in place of turpentine.

BILLIARD-BALL COLOURING

Old balls are greasy, and do not take on the colour well until they are cleaned. Most people who try the dyeing omit the cleaning, so fail. The way to proceed is as follows:—

First: Wash the ball by immersing in benzine over it, and wipe dry.

Second: Dip it in an acid bath 30 drops of nitro-muriate of tin solution to 3 oz. of water. Allow to remain in the bath for a few minutes.

Third: Give it the dye-bath.

The following are some of the best dye-bath:—

RED

1. Aniline	1 part.
Water	20 parts.
2. Powdered cochineal	1 dr.
Stannous chloride	1 "
Water	12 oz.
Boil and strain. Use warm.	
3. Carmine	3 gr.
Ammoniacal water	1 oz.

BLUE

Methyl-blue	10 gr
Water	1 oz.

GREEN

Diamond green	1 part.
Water	20 parts.

YELLOW.

Potassium chromate (solution 1 in 20), followed by same strength of lead-acetate solution.

For other colours use alcoholic solutions of aniline dyes.

Brief Queries and Replies

Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge in serial order. Questions are replied by post on receipt of As. 8 stamps for each question. Subscribers outside India are requested to send two International Reply coupons for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.

631 R.K.P.S., Benares—For starting an enamel factory you should invest at least Rs. 1 lakh. For learning chemical technology you may write to the Principal, Science College, University of Calcutta, 92, Upper Circular Rd., Calcutta. Plastic, rubber and fuel industries have good prospect. Advertisement is published in newspapers announcing Government help for technical education. It is proposed to manufacture Motor oil from coal. Power alcohol will be manufactured from molasses.

632 P.M., Calcutta—Process of manufacturing medicinal syrup will be found in Manufacture of Syrup and Cold Drinks published from this office, price Rs. 3-7 including postage.

633 J.D.D., Jaipur City—We have no book on sand paper or emery paper manufacture. Process of manufacturing sand paper will be found in March 1949 issue of Industry.

634 D.H.H., Calcutta—We have not got an exhaustive list of homeopaths of W. Bengal and E. Pakistan.

635 G.L.J.P., Agra—For crude oil engine enquire of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta and Francis Klein & Co., Ltd., 1, Royal Exchange Place, Calcutta.

636 S.M.G.W., Firozabad—Wants to be put in touch with the manufacturers of celluloid strap rolls and brass buckles for wrist watch straps.

637 G.N.S., Mathura—For cloth washing machine enquire of Jessop & Co., Ltd., 93, Netaji Subhas Road, Calcutta.

638 N.S.S., Makhantol—For starting aluminium utensil manufacture you should appoint a mistri who will help you. We have no book on the above subject.

639 R.C.R.H.P., Kishanganj—Process of manufacturing pencil will be found in Industry Prize Article published from this office, price Re. 1-15 including postage.

641 S.S.S., Fyzabad—For textile machines enquire of W. H. Brady & Co., Ltd., Mercantile Bldgs., Lall Bazar, Calcutta. Electroplating machines may be had of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta. For washing machine enquire of Jessop & Co., Ltd., 93, Netaji Subhas Road, Calcutta. Ice candy machine may be had of Refrigerators (India), Ltd., 59C, Park Street, Calcutta.

642 J.B.C., Hyderabad—For sheet metal working machine you may enquire of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

643 P.K.K.N., Trivandrum—You can draw water from underground by boring tube well. For detail you may consult an engineer.

644 S.H.M., Ghaziabad—We have no book on cotton bleaching. You may enquire of Thacker Spink & Co. (1933) Ltd., 3, Esplanade East, Calcutta.

647 A.D.J., Delhi—You may start a hosiery factory with Rs. 40,000. You may also start a bucket factory.

648 J.S.M., Balaghat—You may consult Pharmaceutical Preparations and Manufacture of Toilet Goods both the books published from this office. You may prepare pain balm and snow and if you find any defect you may refer it to us when we shall try to slove it.

649 H.A.S.H., Ponduru—Process of manufacturing matches will be found in Safety Matches and Their Manufacture by K. C. Das Gupta published from this office.

652 R.D., Bombay—Following is a list of newspapers: La Tribuna, Rome. Italy; La Roma, Naples, Italy; Japan Times and Mail, Tokyo, Japan and Japan Advertiser. Tokyo, Japan.

653 C.C.M.C., Calcutta — Directories are published by Thacker Spink & Co. (1933) Ltd., 3, Esplande East, Calcutta and Times of India, Times of India Bldg., Bombay.

654 S.K.C., Calcutta—Process of manufacturing rubber solution and glycerine suppositories will appear in Formula Section in due course.

657 A.T.C., Jubbulpore—We have no book on minerals and their uses. You may however enquire of W. Newman & Co. Ltd., 3, Old Court House Street, Calcutta.

658 A.L.S.D.R., Mannady — It is very difficult to start a business with Rs. 200/- only as capital. You may however try to manufacture biris and sell in the market in your leisure time.

660 S.A., Ludhiana—For rolled gold ornaments enquire of New Indian Rolled & Carat Gold Co., 1, College Street, Calcutta.

661 A.M., Dhubri—Process of manufacturing lozenges will be found in Manufacture of Confectionery, published from this office, price Rs. 3/7/- including postage.

662 N., Thana—Process of manufacturing emery wheel will appear in Formula section in due course.

663 R.S.C., Agra Cantt.—In manufacturing phenyle you should use solid rosin. Process of manufacturing rubber baloons and eye dropper lids will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage.

664 M.N.N., Tirupattur—Collapsible tubes may be had of Metal Box Co. of India Ltd., B2, Hide Road, Kidderpur, Calcutta. For cardboard boxes enquire of Bengal Cardboard Industries and Printers Ltd., 165, Cornwallis Street, Calcutta.

665 G.C.P., Darbhanga — An article on candle manufacture appeared in May, 1949, issue of Industry.

667 T.H., Calcutta—You better advertise in our journal so that intending candidates will negotiate with you.

668 N.B.D., Calcutta — In formulas q.s. stands for sufficient quantity. Musk is mriganabhi. Perfumes may be had of Paradise Perfumery House, 7, Colootola Street, Calcutta. Tin pots may be had of Bengal Tin Box Mfg. Co. Ltd., 1, Jadunath Mitter Street, Calcutta.

669 R.S.S., Kanauj—All the chemicals you require may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, and Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane; both of Calcutta.

670 R.K.C., Delhi—Hing is extracted from a species of herb which is found wild in Eastern Persia, Kharsan and other localities. Hing is obtained by wounding the upper part of the root, from which a small quantity of gum escapes and is collected. The living root is then sliced daily or every two or three days with the exudation adhering to it, till exhausted. Whole mass consisting of alternate layers of root and gum resin is packed in skin.

672 D.R.C., Bombay—For rubber caps write to Bengal Waterproof Works, (1940), Ltd., 32, Theatre Road, Calcutta and New Modern Rubber Works, 17, Tara Chand Dutt Street, Calcutta.

674 M.T.C., Mandsaur—There is no arrangement here for practical training in soap and phenyle at present.

676 M.B., Kanpur—For foreign goods enquire of John Barret & Co., Post Box No. 2165, G.P.O., Calcutta. For black pepper enquire of Banshidar Dutt, 126, Khengrapatty Street, Calcutta.

677 R.S., Saharanpur—We have no such publication. You may however enquire of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

678 O.P.M.L., Ambala City — Printing machines may be had of Printing & Industrial Machinery Ltd., Windsor House, P-14, Bentinck Street, Calcutta and Indo-Swiss Trading Co., Ltd., P-33, Mission Row Extension, Calcutta.

680 R. P.P., Davol—Aloe industry has good prospect. We have no arrangement for chemical analysis at present.

682 G.G.G., Mirzapur—We have no book on soap stone business. For selling soapstone powder you may negotiate with Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta and Indian Mineral Industries Ltd., 22/1, Dum Dum Road, Calcutta.

683 S.M.G.W., Firozabad—We have no book in Hindi. An article on plastic industry appeared in December, 1948 issue of Industry.

685 C.M.C., Bhusawal — Tablet making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

687 L.B.S., Matara—For international reply coupon enquire at local post office.

688 M.L., Amritsar—We have no such book. You may write to Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

690 R.S.B., Bhopal — For manufacturing button you have to use machines which may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta. There is no arrangement for giving practical training in manufacture of syrup, tobacco preparation and electroplating.

692 N.D., Gauhati—We are not aware of any institution where degrees such as B.A., B.Sc., etc., are given by correspondence course and are recognised by Government.

694 R.C.C., Bombay—It is not possible to manufacture Vegetable ghee without any plant simply mixing something.

696 B.N.S., Hajpur—Optical goods may be had of Bombay Optical House, 14, Bowbazar Street and Lawrence & Mayo (India) Ltd., 11, Govt. Place East, all of Calcutta.

697 P., Khurja—For soluble starch enquire of National Trading Co., Ltd., Esplanade Road, Delhi and Pioneer Chemical Co., Phatak Habash Khan, Delhi.

700 G.S.M., Shimoga—We have no book on arecanut industry.

703 R.S.S., Kanauj—All the chemicals you require may be had of Calcutta Chemical Co., Ltd., 10, Bonfield Lane, Calcutta and Allied Agency, 16, Bonfield Lane, Calcutta.

704 J.K.S., Muzaffarpur—An article on candle making will be found in May, 1949 issue of Industry.

706 D.N., Gorakhpur—In order to import goods from U. S. A. you have to secure Import Licence from the Government of India. For this write the Controller of Imports, New Delhi.

707 J.S., Ludhiana—Formulas of face cream and baldness cure will appear in Formula section in due course.

708 S.N.S., Pushkar—You may take agency of some industrial products and sell in local market. In this way you will make some profit which you will keep for meeting your educational expense.

709 K.P.S., Meerut—We have no book on silk weaving. You may refer your query to the Director of Industries of your province.

710 T.K.S., Bombay—For selling the articles you deal in advertise in our journal. We shall also recommend your name when occasion arises.

711 M.R.K, Jubbulpore — Address of Jabakusum Hair oil manufacturer is Jabakusum House, Chittaranjan Avenue, Calcutta and the address of Himakalyan hair oil is N. Bhattacherjee, 3, Shib Shankar Mallik Lane, Calcutta 4.

712 H.G.S., Ahmedabad—Collapsible tubes may be had of Tambawala Metal Manufacturing Works, 66/68, Narayan Dhuru Street, Bombay 3; T. Sharman & Sons, Tirlok Bhawan, Kashmere Gate, Delhi and Metal Box Co. of India Ltdd., B2, Hide Road, Kidderpore, Calcutta.

714 B.T., Bombay—For slate pencil making machine enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

716 W.A.B.P., Grandpass—For spinning machine enquire of W. H. Brady & Co. Ltd., Mercantile Bldgs., Lall Bazar, Calcutta.

719 R.K., Lucknow—We have no book on watch making. You better enquire of Standard Literature Co. Ltd., 13/1, Old Court House St., Calcutta.

722 K.L.N., Walajahpet — Process of manufacturing camphor will appear in Formula Section in due course.

723 M.G., Rewari—For tallow enquire of Indian Bristles & Lard Supply Co., 31/1, Tangra Road, P.O. Tangra, Calcutta.

726 F.S.F., Jodhpur—It is not possible to manufacture soap without coconut oil. You have to use a portion of coconut oil. Recipes of soap of different varieties will be found in Manufacture of Soap published from this office, price Rs. 4/7 including postage.

728 P.H.L, Kanpur—For importing goods from foreign countries you have to secure Import Licence for which write to The Controller of Imports, New Delhi.

731 K.E.S.C, Budaun—We have no book on flour manufacture. For machines you may enquire of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta. Machine supplier will furnish you with price and capacity of the machine.

732 S.V., Lucknow—Process of manufacturing rubber solution, marking ink, etc. will appear in Formula Section in due course.

733 C.A.H, Baroda—Process of manufacturing lead pencil will be found in Industry Prize Article, published from this office, price Re. 1/15/- including postage. We have no book on plywood manufacture. For books on plywood manufacture write to Forest Research Institute, Dehra Dun.

734 B.H.F., Saharanpur—You will find address of cement manufacturers in Industry Year Book & Directory published from this office, price Rs. 12/-.

738 K.V.S., Narsapur—For tin cans enquire of Bengal Tin Box Manufacturing Co. Ltd., 1, Jadu Nath Mitter Lane, Calcutta 4.

740 S.T., Simla Hills—There is no institution where practical training is given on rubber industry. Wants to be put in touch with the agents of Veretex in Calcutta and Bombay.

743 M.R.S., Bombay — Process of wool bleaching and polishing nut buttons will appear in Formula Section in due course.

746 D.D.H., Tezpur—Refer your query to B. K. Paul & Co. Ltd., 1 & 3, Bonfield Lane, Calcutta.

747 T.B.S., Kodaikanal — An article on leather industry appears in April, 1949 issue of Industry. If you go through the article you will get all the information required.

758 G.P.W., Khurja—Process of manufacturing water colour cakes will be found in July, 1948, issue of Industry.

759 C.L.S., Kapurthala—We have no book on wool or silk dyeing. You may however enquire of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

761 L.S., Tirur—Process of manufacturing ultramarine blue appeared in August, 1947, issue of Indusrty. In manufacturing coloured soap by cold process take oil soluble dye and dissolve it in oil. Then proceed as usual.

768 T.G.C., Gorakhpur—Following is a list of toilet goods manufacturers and dealers: Reliable Stores, A-27, New Market, Calcutta 13; Shahi Perfumery Stores, 91, Colootola Street, Calcutta; B. M. Ahuja & Co., Chandni Chowk, Delhi and Chandra Singh, Main Bazar, Pahargunj, Delhi. Complete list will be found in Industry Year Book & Directory published from this office, price Rs. 13/- including postage.

769 H.S.W., Jaipur City—Wants to be put in touch with the suppliers of dhania oil at Simla.

770 M.V., Tuni—Following is a list of cloth merchants: Banerjee Roy & Co., 220, Harrison Road, Calcutta; Bengal Stores Ltd., 8-A, Chowringhee Place, Calcutta; Bombay Cloth Stores, 165-1, Harrison Road, Calcutta; Calcutta Cloth Stores, 220-1A, Harrison Road, Calcutta; Bombay Cloth Market Co. Ltd., 13, Princes Street, Bombay; Ramkrishandas Sagarmal, 354, Kalbadevi Road, Bombay; Bawa Parduman Singh & Sons, Delhi and Lekhraj Bisambar Dyal, Cloth Market, Delhi. An exhaustive list will be found in Industry Year Book & Directory published from this office, price Rs. 13/- including postage.

771 H.S.W., Jaipur City—Soap manufactured with linseed oil emits bad smell. This can be removed by adding some strong perfumes such as citronella oil.

774 G.P.S., Delhi—We have no book on glass blowing. You may start perfumery industry, ink manufacture, etc. on small scale.

777 P.K., Coimbatore — Shellac water varnish is made by dissolving shellac in borax solution. Following is a formula of shellac water varnish:—Water 2 gallons; shellac 3 lbs; borax 1½ lbs. Borax should be powdered. Boil shellac and borax in water until dissolved.

779 T.S.G.S., Bahraich—For machines and particulars write to Balmer Lawrie & Co. Ltd., 103, Netaji Subhas Road, Calcutta; Marshall Sons & Co. Ltd., 99, Netaji Subhas Road, Calcutta and Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

781 R.B.G., Alwar—You have to invest at least Rs. 1 lac for starting a safety razor blade factory. Wants to be put in touch with the suppliers of duck feathers; corks, leather, perforating machine and groove die. Comb and hair clip making machines may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta and Francis Klein & Co Ltd., 1, Royal Exchange Place, Calcutta. For carbon paper making machines enquire of Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta.

783 B.B.P., Sangli — For rope making machine enquire of Urquhart Lindsay & Robertson Orchards Ltd., C/6, Clive Bldgs., Calcutta.

784 S.S.M., Karachi—For rectified spirit enquire of Carew & Co., Darshana, E. B. Ry.

795 D.A., Gwalior — Process of purifying honey will be found in March, 1949, issue of Industry.

797 H.S.M., Hazaribagh — Refer your query to A. Mitra & Co., 5-2F, Raja Rajballav Street, Calcutta.

798 S.A.A., Karachi—You may communicate with Regal College of Physicians, 39, Neogipukur Lane, Calcutta and International Institute, Aligarh for obtaining degree by correspondence course.

799 K.I.W., Kuppam—You may try the following formula of label paste: Wheat flour 8 oz; alum ¼ oz; caustic soda 2 dr; water 32 oz. Dissolve the alum and caustic soda in the water add the wheat flour and rub to produce a smooth paste then heat, with constant stirring, until a stiff paste results. By further cautious heating the paste can be reduced to powder, which is mixed with water for use.

800 J.B.R.W., Nadia—For grinding and tablet making machines enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta and Prabartak Commercial Corporation Ltd., 61, Bowbazar Street, Calcutta.

801 R.P., Lashkar—We are not aware of any firm in India manufacturing watches and watch parts. Process of silver and gold plating will be found in Electroplating in Practice published from this office, price Rs. 3/7/- including postage.

802 P.H.L., Kanpur—For securing import licence you may negotiate with the Controller of Imports, New Delhi.

803 M.M.S.R., Jammu—Following is a recipe of bottle capping solution: Gelatine 500 parts; gum acacia 100 parts; salicylic acid 4 parts; water 1400 parts; starch 200 parts; aniline dye a sufficient quantity. Heat the gelatine, gum acacia and salicylic acid with 1000 parts of water strain, add the starch and the remainder of the water as well as the dye. For use warm the paste and dip the neck of the bottle into the paste.

806 M.R.S., Gurdaspur—Address of Dacca Sakti Oushadhalay is 52/1, Beadon Street, Calcutta.

807 S.A.M., Rangoon—Plants required for vegetable ghee manufacture may be had of Marshall Sons & Co. Ltd., 99, Netaji Subhas Road, Calcutta. You may consult Hydrogenation of Fats and Oils by C. Ellis.

809 P.P.C.S., Lashkar—Process of rubber tyre manufacture will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage. We have no book on cardboard manufacture. For books on cardboard industry enquire of Standard Literature Co. Ltd., 13/1, Old Court House Street and W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta.

810 C.B., Khagra—We have no book on laundry business. For laundry machine enquire of Jessop & Co., Ltd., 93, Netaji Subhas Road, Calcutta. They will supply you detailed information regarding laundry machines and their working.

811 V.T.C., Rajpur—Process of colouring tea will appear in Formula Section in due course.

813 G.C.D., Madras — For tape making machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

815 B.C.R.L., Bareilly—For electro-medical apparatus enquire of Medico Scientific Stores, 30, Colootola Street, Calcutta.

820 R.K., Ludhiana—We are not aware of any other formula of duplicator. We cannot supply exact formula of any proprietory article. We have no book dealing with duplicator manufacture. You may enquire of Standard Literature Co. Ltd., 13/1, Old Court House Street, Calcutta.

821 B.D.G., Nagpur — For air pillows enquire of Bengal Waterproof Works, (1940), Ltd., 32, Theatre Road, Calcutta. For plastic bangles enquire of Abdul Kayum Esufally &

Bros., 193, Abdul Rehman Street, Bombay 3 and Popular Plastics, Ruby House, Opp. Colaba Tram Terminus, Bombay 5.

823 N.A P, Cocanada—Process of manufacturing plastiap will appear in Formula Section in due course

824 C S A, Rajamundry—Chalk crayon making machine may be had of Small Machineries Mfg. Co, 22, R G. Kar Road, Calcutta. Chalk and other raw materials may be had of Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta

825 S P, Madras — Before making the tablets use gum powder as binding agent and put in tablet making machine.

829 D M, Bombay—Following is a list of newspapers and periodicals. Home Gardener, Melbourne, Australian Food Manufacture, Age, Melbourne, Iraq Times, Iraq, Egyptian Gazette, Alexandria; Rangoon Times, Rangoon and Rangoon Daily News, Rangoon.

831 S W, Madras—Before packing stir vigorously to ensure thorough mixing. As regards difficulty in bottling you should prepare smaller quantity at a time.

833 G C, Banaras—Process of mercerising yarn and delustring art silk will appear in due course.

835 G R, Khargpur — Address of India Cycle Manufacturing Co. Ltd., is 9, Tiljala Road, Calcutta

837 B S, Jalpaiguri—Ink making ingredients may be had of Banshidhar Dutt, 126, Khengrapatty Steert, Calcutta and Calcutta Chemical Co Ltd, 10, Bonfields Lane, Calcutta.

838 M.P.R., Allahabad—Before exporting goods from India to foreign countries you should obtain Export Licence for which write to Controller of Exports, New Delhi. Refer your query to the Indian Trade Commissioner in England, Aldwych, London W. C. 2.

839 M.T., Gwalior—For carbide enquire of Radha Kanto Dass & Sons Ltd, 211, Old China Bazar Street, Calcutta and Shaw Wallace & Co., Bankshall Street, Calcutta. Tartaric and citric acids are not manufactured in India at present. Medicine business has good prospect but you should advertise widely in local papers. You may consult Cotton Dyeing & Printing published form this office, price Rs. 3/7/- including postage

840 M S.H B, Karachi—Following is a formula of liquid depilatory· Sodium sulphide 14 oz; rectified spirit 4 oz; glycerine 1¼ lbs; lavender oil 1 oz; water 20 lbs. Dissolve the sulphide in some of the water and finally the lavender oil, dissolved in the spirit mix well and filter.

841 S.M.A.R.M.I., [illegible] — For cigarette making machines enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

842 N.T.C., Bombay — To oxidise brass articles immerse them in a solution of 2 oz. of nitrate of iron and 2 oz. of hyposulphate of soda to 1 pint of water until the desired shake of oxidation is acquired, then wash, dry and brush.

843 T.B.P., Howrah—Following is a recipe of sweet scented perfume Linalol ½ dr; bergamot oil ¾ dr; jasmine oil ¾ dr; jasmine 7½ oz; alcohol 8 oz. Mix thoroughly by shaking.

844 D B, Sambalpur—Following is a formula of scented castor oil: Castor oil 24 oz; benzyl benzoate 2 dr.; jasmine 3 dr.; narcissus 4 dr.; benzyl acetate 1 dr.; sandal 2 dr. Take refined castor oil and mix the benzyl benzoate and shake for a few minutes. Then add the essential oils one by one shake for a few minutes and then keep aside for a day or two well covered. Lastly put in phials.

845 G P.T, Agra—Refer your query to The Indian Trade Commissioner, India House, Aldwych, London W.C.2.

846 A.K., Agra—For plastic sheets enquire of Abdul Kayum Esufally & Bros., 193, Abdul Rehman Street, Bombay 3 and Popular Plastics, Ruby House, Opp. Colaba Tram Terminus, Bombay 5.

847 A.C.K., Dhubulia—Process of manufacturing all kinds of soap will be found in Manufacture of Soap published from this office, price Rs. 4/-/- including postage.

849 M.A.S., Agra—For distilling plant enquire of Adair Dutt & Co. Ltd., Stephen House, 5, Dalhousie Square, Calcutta. Other industrial machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta and Probartak Commercial Corporation, 61, Bowbazar Street, Calcutta.

851 Q.M.A.C., Allahabad — For selling shares you may negotiate with the following firms: Bengal Share Dealers Syndicate, 12, Chowringhee Square; East India Stock and Share Dealers Syndicate Ltd., 2, Royal Exchange Place and Investment Exchange, 25C, Swallow Lane; all of Calcutta. Consuls of Japan and Germany have not yet established office in India.

852 J.D.D., Bombay — You may negotiate with Homeopathic Shiksha Mandir, 33-1, Sri Bijaynagar, Bikaner for learning homeopathy in Hindi.

854 R.N.P., Chapra—You may write to the Principal, Indian Forest College, P.O. New Forest, Dehra Dun for prospectus.

857 H.G., Asansol—For particulars enquire of Bombay British Institute of Engineering and Technology (India), Ltd., Hornby Road, Bombay.

858 H.N.L., Muzafferpore—An article on candle manufacture appeared in May, 1949, issue of Industry. Candle moulds may be had of Small Machineries Manufacturing Co., 22, R. G. Kar Road, Calcutta 4.

859 B.T.L., Banaras—For arecanut cutting machines enquire of Batliboi & Co., Forbes Street, Fort, Bombay and H. M. Mehta & Co., Apollo Street, Bombay.

860 B.D.S., Barmer—We have no Hindi books.

861 C.M.F., Unjha—In order to keep the brightness of mercuric compound do not allow it to come in contact with air.

862 A N.P.C., Salem—Process of manufacturing mantle will appear in Formula Section in due course. For machines enquire of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

863 M.S.C., Jharia—All the ingredients you require may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta.

864 M.B., Bombay—Refer your query to the Director General, Geological Survey of India, 29, Chowringhee Road, Calcutta.

865 B.R.P., New Delhi—Process of manufacturing battery separator will appear in Formula Section in due course. You may start a soap factory with Rs. 6000.

866 G.C., Vijaywada—You may use stainless steel as axle of the grinding stone.

867 M S., Bapatla—There is no institution where training is given on leather industry. You should consult any book on design on leather goods which may be had of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

869 S.C.P.N., Chirala—Address of Planter's Union is 162, Bowbazar Street, Calcutta 12.

870 A R., Hyderabad—You may consult Kelly's World Directory published by Kelly's Directories Ltd., 196, Strand, London W. C. 2. Refer your other queries to Thomas Cook & Son Ltd., 4, Dalhousie Square East, Calcutta.

874 A.M.S., Tezpur—For services of an expert in bucket manufacture advertise in newspapers. Bucket making machines may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta.

877 R.K.T., Abrama—You may negotiate with Tata Chemicals Ltd., Mithapur, Kathiawar and Imperial Chemical Industries Ltd., 18, Strand Road, Calcutta.

878 S.P.S., Bihar Sharif—Safety razor blades are manufactured from steel ribbon which is imported from Norway. For starting this industry you have to invest at least Rs. 1 lakh.

880 H. N. L., Muzaffarpur — Knitting machines may be had of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

881 R.C.C., Jaora—Process of preparing Diesel Oil from crude oil will appear in an early issue of Industry.

885 C.M.E.A., Karimganj—Glass powder, slate powder, etc., may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta.

887 S.N.S., Lucknow—Stationery goods may be had of Atlas Stationery Mart, 25, Radha Bazar Street, Calcutta; Bengal Stationery Concern, 14-2, Old China Bazar Street, Calcutta; British Indian Stationery Supply Co., 57, Radha Bazar Street, Calcutta; Bharat Stationery Mart, Chowk Hauz Kazi, Delhi; K. C. Bhargava & Co., P. O. Box No. 247, Delhi and H. M. Chopra & Sons, 506, Old Fort, Camp, New Delhi. Paper may be had of Bhagat Prosad & Sons, Chowri Bazar, Delhi; J. N. Singh & Co., Ltd., 319, Esplanade Road, Delhi; Calcutta Paper Agency, 133, Canning Street, Calcutta; Mukherjee Dutt & Co., 31, Jackson Lane, Calcutta and P. B. Kundu & Co., 136, Old China Bazar Street, Calcutta.

888 M.S.S., Kotagiri—All the ingredients required for agnimukha churna may be had of Banshidharr Dutt, 126, Khengrapatty Street, Burrabazar, Calcutta and Banga Lakshmi Bhandar, 13, Cotton Street, Calcutta. Holes are bored in sheet glass by means of drilling machine. For etching glass you should use hydrofluoric acid. You may use oil varnish.

890 V T K., Bijapur—Following is a formula of carbon electrode: Calcium fluride 40 parts; strontium flouride 10 parts; sodium silicate 5 parts; carbon flour 45. Tar sufficient to bind. First mix the powders; then add the sodium silicate and lastly add enough tar to make a stiff mass. Then extrude through hydraulic press and bake.

891 K D., Nagpur—For polishing steel slates rub the slate with pencil stone and apply a coat of infusion of gall-nuts.

892 V.N M., Bombay—You may consult Electroplating in Practice by M. N. Mitter published from this office, price Rs. 8-7 including postage.

893 D.C.D., Bombay—You may consult All About Fruits published from this office, price Rs. 5/7/- including postage.

894 R.C.T., Agra—Carnauba wax is not manufactured in Calcutta. This is a natural product. Shellac wax is manufactured by Angello Bros., 6, Lyons Range, Calcutta.

897 H.A., Banaras—We are not aware of any machine in making laces. You may how-

ever enquire of W. H. Brady & Co. Ltd., Mercantile Bldg, Lall Bazar, Calcutta.

898 I S, Delhi—Matches may be had of Western India Match Co. Ltd., Alambazar, Calcutta, Cambay Match Works, Cambay, Kaira and Kotah Match Factory, Kotah Junction Match making machines may be had of Harima Engineering Works, 69-1, Belgachia Road, Calcutta and Standard Machinery Co., 86B, Netaji Subhas Road, Calcutta. For candle making mould enquire of Small Machineries Mfg Co, 22, R G Kar Road, Calcutta.

900 C M A H Pernambut—For wire clipping machine enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

903 S N R, Calcutta — For origanum enquire of Paradise Perfumery House, 7, Colootola Street, Calcutta.

907 V R V, Calcutta—For rust removing you may try the following formula: Ammonium chloride 100 lbs, ammonium acetate 50 lbs; sugar 18 lbs, glue 18 lbs; pyrogallol 1 lb; water 100 gal After manufacturing the wire nails you may dip them in the above solution

913 H.S S., Amritsar—Formulas of hingul, murdasankh, etc will appear in Formula Section in due course.

914 A.V S N M, Kakinada—Confectionery and biscuit making machines may be had of Small Machineries Manufacturing Co, 22, R. G. Kar Road, Calcutta. An article on tooth powder manufacture appeared in March, 1949, issue of Industry.

917 B S K S, Dhampur—We are not aware of addresses of agent of foreign goods other than those already appeared in Industry Year Book and Directory which you have already got.

920 S M K., Sheikhupura — For books on leather industry enquire of Thacker Spink & Co. (1933), Ltd, 3, Esplanade East, Calcutta and Standard Literature Co. Ltd., 13/1, Old Court House Street, Calcutta.

921 N C, Dacca—Coaltar is obtained by distilling coal. You perhaps mean artificial coaltar which is prepared by melting pitch and adding to it solvent naphtha and kerosene oil in suitable proportion

924 H.J., Shillong—Tejpat or cassia leaves are used for culinary purpose and for preparing ayurvedic medicines You may consult Hindu, 201, Mount Road, Madras and Sunday Times, 45, Peters Road, Cathedral P.O., Madras 6.

932 B M.S, Ankleshwar—Following is a formula of imitation gold Copper 90 parts; gold 2.5 parts and aluminium 7.5 parts. There is no institution where handwriting experts are taught to detect handwriting.

933 A.A., Delhi—Following is a formula of gum to be applied on paper: Gum arabic 1 part; starch 1 part; sugar 4 parts; water sufficient to give the desired consistency. The gum arabic is first dissolved in some water, the sugar added, then the starch after which the mixture is boiled for a few minutes in order to dissolve the starch after which it is thinned down to the desired consistency.

935 R S, Barakar—We have no book dealing with the manufacture of iron screw and hinges. For machines you may write to Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta For each item you have to invest at least Rs. 1 lakh.

936 E.I G.C., Bombay—As far as we know zipper is not manufactured in India at present. For machine enquire of Francis Klein & Co. Ltd, 1, Royal Exchange Place, Calcutta. For prices of machine you may write direct to the party

937 H C., Navsari—You should apply ordinary shellac varnish. You may try the following formula: Shellac 4 lbs; methylated spirit 25 lbs;

940 G G.W, Balawali—It is not possible to manufacture sewing needles on a small scale. In this connection you may consult an expert.

942 P.M.I., Cochin State — For selling photo screw ring and other things you should advertise in Industry.

945 Y B P., Chandausi—Process of manufacturing casein will be found in Milk & Milk Products published from this office, price Rs. 3/7/- including postage. Following is a list of casein dealers: Casein Trading Co., Anand; Murray & Co., 43, W. C Bonerjee Street, Calcutta and Pannalal Kishorilal, Mainpuri.

950 R.B.S., Sitapur—Suji is obtained by grinding wheat in preparing atta. Larger grain are known as suji.

951 S.P.R.R., Chilakalapudi — You may roast betelnut powder in an iron pan.

954 M.S.R.M., Berhampur — Cut silver leaves in small pieces and pour some glycerine and the pills in a round vessel and turn it round and round when the pills will be silver coated.

957 R.U., Nellore—Process of manufacturing luminous paint will appear in Formula Section in due course.

958 K.T.C., Dharangan—We have no book on paper manufacture. You may enquire of All India Village Industries Association, Maganvadi, Wardha C.P. for a book on paper manufacture.

Review of Books

FINANCE OF INDIAN PLANNING. Published by Vora & Co. Publishers Ltd., 3-4, Round Building, Bombay 2. Pages 113, price Rs. 3-12.

For the economic betterment of India, it is ssential that an economic plan should be volved after careful deliberations of the exact ature of our economy. With regard to the rgent necessity of planned economy there can e no two opinions. But opinions will vary in egard to correct approach to this problem.

C. W. Zacharia's book "Finance of Indian 'lanning" has endeavoured to give right clue to his problem. We have had enough of planning. ind there have been a good deal of literature n this particular subject. But the novelty of his book lies in the fact that it has opened up new important and vital aspect—the financial spect which has not received the attention 'hich it deserves.

Here, in this book, the author has made a omparative study of planning in foreign counries as well as planning in India and has disussed and explained the financial aspect of lanning in India.

Vast resources lie untapped and unexploitd. And planning for the development of these esources, he affirms, must be in keeping with ie financial resources of the country.

The author carefully examines the various nancial sources e.g. Internal savings, past avings, gold, gems, jewellery, sterling, foreign orrowing.

What is disquieting is that internal saving 'hich is the main sources of supply shows an ielasticity. The ultra commonplace object of aising the standard of living does not find a esponse in the people in general and fails to timulate investment. Mr. Zacharia rightly bserves "economic necessity unless clothed in ie garb of moral obligations can never conire up that degree of individual and social onstraint which is indispensable for the perormance of great acts of self denial."

COMMERCIAL WAXES. Edited by H. ennet. Published by Chemical Publishing Co., ic., Brooklyn, New York, U. S. A. Pages 583.

Waxes of animal, mineral and vegetable rigin find large uses in the manufacture of a ide range of articles, e.g. dental preparations, p-sticks, candles, carbon paper, ink, waxed apers, shoe polishes, stencils, paint and varnish, aterproof coatings, etc., etc. Waxes of ynthetic origin have been lately introduced with ood effect as substitute for the natural waxes. he book under review gives an exhaustive assification of the different sorts of natural id synthetic waxes available for use in manucturing various commercial products. Physil and chemical properties of waxes and wax mpositions have been studied in full in relation to their viscosity, surface tension, penetration, adhesiveness, refractive indices, moisture absorbtion, conductivity, volume resistivity, etc. The tables included in this chapter will be found most valuable and helpful to those using new wax compositions.

The book also discusses in full the treatment of the waxes, e.g. melting, colouring, emulsifying, detection of impurities and adulterants. The most important chapters of the book are those devoted to "Waxes in Industries" and "Wax Formulary." In these chapters the editor considers the applicability of the various waxes and wax compounds in various industries and offers a lot of practical formulas for the manufacture of very many consumer goods in large demand in the country. In short the book compiles all available information about natural and synthetic waxes including properties, uses, methods of handling and formulas for making commercial wax compositions.

FATEFUL YEARS. Published by Vora & Co., Publishers Ltd., Bombay 2. Pages 149, price Rs. 12/-.

Fateful Years is an anthology of the speeches and writings of Acharya J. B. Kripalini, delivered during the most crucial phase of Indian history. The speeches and writings centre on diverse and multifarious topics. And it is, in vain, to discover within them any principle of unity or homogeneity. The problems to which these speeches constantly refer are the natural product of a troubled transitional epoch.

The main emphasis all throughout his writings, lies on the orgy of communal, violence and passions that swept away whole of India from its moorings of sanity, reason and good sense. Acharya has not only delineated them with his usual descriptive powers, but has given the psychological factors and reasons that inevitably led to this unfortunate tragedies.

But they are no mere historical and analytical studies. They are also revelation of the inner self of the man who wrote them. They reveal a magnanimous, delicate and sensitive soul, writhing with agony at the sacrifice of innocent and helpless victims in the flame of communal violence.

This book, among others, contains his reflections on "racial arrogance." "Vietnam" one of the notable features of his charater is that not for a moment was his mind vitiated by communal passion and violence. And his robust nationalism remained unshaken even in the most critical phase of Indian history.

The writings are thought-provoking and illuminating, and bear the unmistakable stamp of his clarity of thinking and insight. We commend this book to our readers.

FORGING AHEAD. Published by the Mail Publishers, 360-64 Barkly Street, Footscray, Melbourne, Australia.

Forging Ahead gives us a vivid impression of the adbancement of this great Continent, Australia, in all its varied aspects, social, economic and industrial. The delineation is mainly pictorial, and therefore all the more attractive. It requires a good deal of patience to go through the dull, dismal pages of mere history. But if the whole history of it is delineated, in vivid, brilliant pictorial representations, it involves no intellectual strain on the part of the readers, but appeals directly to the imaginative and thinking mind.

The whole book is divided into several sections. And each section embraces within itself the significant and relevant illustrations. The pictorial illustration has the obvious and positive advantage of arousing keen interest in the subject represented. From those considerations, this book is not only illuminating but also impressive.

The major aspects represented may be stated as follows:—(1) Civic Administration, (2) Freedom of Worship, (3) Industry and Agriculture.

The main object of this publication is indeed very laudable. Obviously the object is to bring Australia and Overseas countries closer. And that is only possible when they have known and understood one another.

The book is highly informative. We commend it to our readers.

HANDBOOK OF INDO-AUSTRALIAN TRADE. Published by The Bureau of Economic Research, Kanpur, U. P. Pages 60, price Rs. 5/-.

This handbook points out the recent significant developments in Indo-Australian relations which tend towards a happy collaboration between these two countries, particularly in the sphere of trade and commerce. The Australian Trade Mission, who visited India only a few years back came with the avowed purpose to establish a trade relation with India and explore all possible means of co-operation. Their findings, it is encouraging, to learn, are to the best interests of both these countries. They strongly hold that co-operation between these countries are quite a feasible proposition in view of the fact that production in each country are complementary, rather than competitive and also the respective geographical situations of both Australia and India are mutually advantageous to one another. So it will be undoubtedly to the mutual benefit of both India and Australia to know and understand each other and see how far one can help the other. And from that point of view, this handbook, surely, serves a very useful purpose. The first chapter of the book, gives us a comprehensive survey of its agricultural, industrial and mineral resources and their potentialities for future development.

Chapter II deals with trade relationship and prospects and show how the economies of these two countries may be dovetailed into one another to promote their trade and commerce.

Chapter III contains substantial facts and figures relating to imports and exports.

Chapter IV deals with the trade position in pre-war and inter-war period.

Chapter V. of this handbook is of particular significance by reason of the vital statistical tables it contains with especial reference to Australian production, its imports of essential commodities, value of the Australian production and Exports according to industry, agricultural statistics, live-stock statistics, manufacturing statistics. It derives its importance from the fact that it gives us an idea of the extent and magnitude of its industry and trade.

We recommend this book to the interested readers.

NOTICES & REVIEWS

(Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medical preparation and allied substances in this section.)

A NEW ILLUSTRATED WEEKLY

We have the pleasure to receive a copy of the inaugural issue of the illustrated Urdu Weekly, "Nouroz." The aims and objects of this journal is to educate the people in their political and social responsibilities. It is published from 61, Dharmaraja Koil Sereet, Civil Station, Bangalore. We wish this new venture every success.

TRADE ENQUIRIES

(To communicate with any party write to him direct with name and address given below mentioning Industry).

685 Mudalior & Co., Avadi, Madras—Want to be put in touch with the suppliers of cow horns, buffalo honrs, deer and sambhar horns.

721 M.R. Jaiswal, C/o. Govt. Training School, Fatehpur—Wants to be put in touch with flesh, horn and bone contractors and manufacturers.

772 Phielban Industries, 161, Janjikar Street, Second Floor, Bombay 3.—Want to be put in touch with the wholesale dealers in peacock feathers.

782 Thomas Rodrigo & Sons, (India), Ltd., 165, Broadway, Madras—Want to be put in touch with the manufacturers of glass eyes for statues.

815 M.A. Shah, Salamatpur, Bhopal State—Can supply agate.

854 S. Tajammal Husain, Feroze Nagre, Tehsil Parur, Sialkot, Pakistan—Wants to be put in touch with the suppliers of hairs and bristles in Pakistan.

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EDITORIAL CONTENTS FOR JULY, 1949.

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Wanted Agents in each city to sell our washing soaps, terms very liberal, apply to the managing director, Saraswati Vegetable Oil Mills Ltd., 428, Kalbadevi Road, Bombay 774 AA

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AGENCIES, FOREIGN.

Purshottam, M. Patel & Co., Vitogo Parade, P.O. Box 122, Lautoka, Fiji. Wholesale Merchants & Direct Importers of Cotton and Silk piecegoods, Glass Ware Alumunium Ware, Fancy and spices. Etc. offers are invited direct from Manufacturers with samples and quotations. 604 AF

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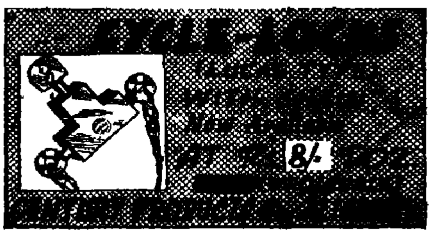
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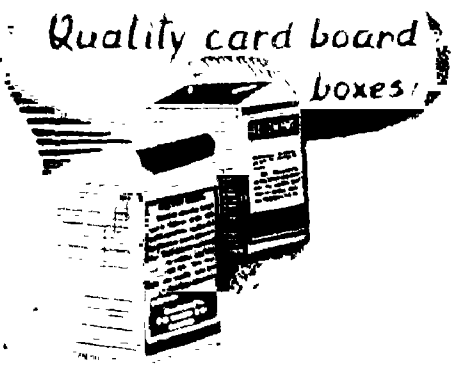
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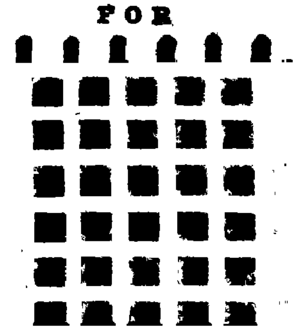
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Industry

EDITOR:
K. N. BANERJEE.

VOL. XL. CALCUTTA, JULY, 1949. No. 472.

PROBLEM OF EXPORT TRADE.

THE task of organising export trade is one of the most difficult problems that confront India Government to-day. The reasons are quite obvious and not completely unforeseen. Most of the traditional items we once possessed, as the items of export trade prior to division of the country are evidently in short supply, partly because of partition and partly because of increased domestic consumption. These factors, would have created complications even under normal circumstances. And they are all the more grave and disquieting particularly in a background when there is a pressing need to maximise our exports for the purpose of financing the imports of capital goods, which are necessary for the building up of Indian industries.

A critical study of the foreign trade account will unmistakably show that the general problem of India's foreign trade is one of deficit amounting to nearly 95.2 crores. Things have come to such a pass when we should ascertain how the deficit may be wiped out. This may be done in two ways—by limiting our imports and increasing our exports. As regards the first measure, it cannot be too strongly emphasised that there are obvious difficulties in restricting imports of food grains or machinery. A limited use of the remedy is all that is possible. And that is being tried through the recasting of the list of articles under the open general license.

But limited use of this remedy, will scarcely help the situation, unless this synchronises with a vigorous drive for increased exports. As a matter of fact, it is through increase of exports that India can hope to maintain an even balance on foreign trade account. As a preliminary step therefore, it will have to be, first of all, examined what are the main obstacles in the way of an expanded export trade. An analysis will evidently show that high domestic demand, unsatisfactory quality of goods, sent out of India, prevalence of high prices, are mainly responsible for this undesirable ebb in export trade. Mr. Neogy rightly observes that the time has now come when we should deliberately assist the gravitation of commodities from internal consumption to export by positive measures, calculated to reduce domestic consumption. There is, however, a limit to which domestic consumption may be reduced. To ascertain this limit, no theoretical estimates will suffice. The limit has to be ascertained, by

(Continued on page 146).

Current Topics

PROTECTION FOR ART SILK.

The Government of India have recently announced the acceptance of the main recommendation of the Tariff Board in regard to protection for artificial silk industry and have agreed, in accordance with the Board's recommendation, to continue the present rate of import duty of artificial silk and mixed fabrics for a further period of two years.

The Board, have, however, found that there is no case for any reduction in the import duty on artificial silk. It may be mentioned here that the industry is mainly dependent on imported yarn. Attempts, however, are being made to increase and expedite the production of yarn in two units. But even if these units go into full and maximum production, it cannot be expected to reach the level of our minimum requirements.

Protection of the industry should not however lull them into self complacency. The native products, as our own industrialists admit, are evidently inferior in quality to the imported products. This is, however, attributed to the poor quality of our imported yarn. So it should be necessarily the primary concern of the Government of India to see that first class and second class yarns are imported from abroad to meet our own domestic requirements.

We cannot really shut our eyes to the realities of the situation. The direct blow will come from Japan. And we should be consequently determined not to allow ourselves to be taken unawares and ousted from our position. Japan's rayon exports during 1944, aggregated 627,000 sq. yds. Though this figure is a mere fraction of the previous 1929 and 1936, exports, 28.4 and 25.6 million sq. yards respectively, even so Japanese competition cannot be altogether ruled out especially in external markets, like Pakistan, which the Indian industry seeks to enter.

We feel there should a vigorous drive for improved quality.

TRANSFER OF THE COMMERCIAL LIBRARY

The Commercial Library of Calcutta is a part and parcel of the whole industrial system in Calcutta. It is the forum of informed, and authentic commercial opinion and intelligence, hence an essential part of the whole system. Consequently, we cannot think of dislodging it

(Continued from page 145)

actually allowing liberal exports to see whether they, in fact, have any undesirable repercussions.

Mr. Neogy also deplored lack of commercial morality which is responsible for the deterioration in the quality of goods sent out. A full and impartial enquiry on a departmental level should be held as a counter measure against these malpractices. Unless steps are taken against these malpractices, markets will slip out of our hands.

Lastly, the prevailing high prices of Indian commodities, are a deterrent to export trade. Prices of the principal exports should be brought in line with world trends so as to have a favourable reception in external markets.

without serious detriment to the interests of trade and commerce.

So far as information goes, a move is afoot to transfer the Commercial Intelligence Section of the Department of Commerce on the plea of economy as recommended by the Economic Committee, Government of India. This transfer, if it comes about, will be highly prejudicial not only to the dissemination of commercial information among the business community, but is likely to affect adversely India's overseas trade. The Department with its attached Library, have been doing very useful service indeed by supplying valuable information regarding sources of possibilities of overseas trade through India's trade commissioners as well as the weekly trade journal.

Calcutta is a centre through which the largest volumes of India's foreign trade is carried on. Therefore the location of Department is not only reasonable but necessary.

Regarding economy, we are really unable to understand how the simple shifting of the Department would economise things.

INDIAN LAC TRADE

Indian lac has a wide, universal demand, in the world markets for use in paints, wood turning industries, for making gramophone records. Nearly 90 per cent. of the world's total output is produced here and the figures showed a steady increase particularly in the inter-war years.

Most of the lac, produced here is exported abroad. Consequently its price is largely determined by the export demand of outside market.

India practically holds a virtual monopoly of lac production. But strangely enough, there has been hitherto no attempt to standardise this product. For a long time, standard specifications adopted by the Shellac Importers' Association and the London Shellac Trade Association formed the basis of export trade in this country. But the importers of many countries have not been satisfied with the gradings and specifications adopted in India, so that the trend of trade in recent years has been to export less and less of processed lac or in other words more and more of the raw product. The state of affairs is really disquieting and can be remedied only when there is an international recognition of the standards for lac. The work of evolving international standards for lac was assigned by the International organisation to the Indian Standards Institution. It is gratifying to note that the I.S.I. Secretarial Committee has now drawn up three draft Indian standards, dealing with Seedlack Shellac, and dry bleached Shellac respectively.

The three draft standards, prepared by the Sectional Committee are being propagated and circulated among those interested in lac trade, inviting their free and frank criticism. The press note has given definite assurance that all the suggestions will be given due consideration. The revised final draft will then be put up to the Chemical Division for endorsement.

The draft Indian Standard Specification for seedlac describes three of the principal requirements namely (a) matter insoluble in hot alcohol (b) colour (c) bleaching index in addition to certain optional requirements which are subject to agreement between the purchaser and the vendor. Five grades of seedlac have been recognised in this standard. As regards shellac, two types have been recognised e.g. (1) hand-made (2)

machine-made in the draft specification for shellac and five different grades and designations have been adopted for each of this type.

The Standardisation of dry bleached shellac is equally a vital urgent need.

The draft Indian Standard specification for dry bleached shellac, which as distinct from hanka, bars or growned bleached shellac, has a lower moisture content.

The need for evolving International Standards cannot be disputed. But once such International Standards have been evolved, it will remain for us, (a harder task indeed) to properly educate the people and induce them to accept the standards.

GRANT OF SUBSIDY TO ALUMINIUM INDUSTRY

The Government have taken a couple of years to arrive at a decision regarding this subject. It may be recalled, in this connection that as far back in 1940 the Commerce Department of Government of India adopted a resolution recognising production of aluminium to be an urgent war necessity. The Government, at that time, gave all possible assurance of help and encouragement in the shape of protection against unfair competition. Recently the view that aluminium is a key industry has been reaffirmed and reiterated. And the Government felt the need of a technical examination of the issues. An official committee were consequently appointed to carry out a further investigation of a technical nature. The present announcement regarding subsidy is a sequel to the committee's recommendations.

Two principal producers of aluminium will be subsidised to the extent of the difference between the fair selling price and their cost of production.

The subsidy will be evidently met largely out the additional revenue expected to be realised from enhanced duties on aluminium sheets, ingot. But the scheme of subsidy, as it stands, throws the whole burden on the consumer. That is evidently an adverse factor. Consequently it should be the primary concern ot the Aluminium Companies to keep strict vigilance over costs of production. Whatever may be the system of subsidy, it is necessary to see that there is no consumer resistance to the use of aluminium.

We are, therefore, pleased to note that the Government have decided to implement those recommendations in particular which are calculated to reduce the cost of production.

The cost of production depends upon so many complicated factors as to baffle our analysis. The official committee have, however, disentangled several of the important factors. They may be briefly stated as follows:—railway freight, duties on raw materials and semi-manufactured materials, provision for the supply of power for attainment of full-scale production, specification to ensure purity of metal in utensils and arrangements for up-to-date equipment from abroad. The Government of India, it is gratifying to note, have taken all these into account and will, it is hoped, take steps to eliminate all adverse factors as early as possible.

We think, we need not emphasise that the country offers great scope for the development of aluminium industry. There is also very urgent need to develop it for the purpose of saving the non-ferrous metals in short supply and also to attain self-sufficiency in a metal of such varied uses as aluminium.

SLATE INDUSTRY

The Government have now announced their acceptance of the principal re-

commendation of the Indian Tariff Board which enquired recently into the case of protection of slate industry.

The Indian slate industry has made rapid headway in the last few years, thanks to the steadily growing internal demand for its products. The future of this industry is closely bound up with the educational progress of the country, which, it is only reasonable to hope, will proceed at a rapid pace. The chief centres of the industry are Kurnul district in Madras, Patiala, Kund in East Punjab, Piplia and Gwalior. There are at present 160 factories of different sizes in the whole of Indian Union.

It may be recalled that Mr. G. L. Mehta in the course of his address, stressed the fact that while the quality of Indian slate was reported to be satisfactory, there was enough room for improvement. He also stressed the fact that it was the most opportune moment to make a drive for quality production since no imports were allowed from dollar and hard currency areas and imports from soft currency areas were subject to monetary ceilings. It therefore behoves the manufacturers to improve their own quality.

The industry is fortunately blessed with abundant supplies of raw materials in the shape of slate stone deposits, but its demands relate to additional assistance by way of lease to the Markapur Slate Manufacturers Association of Govt. mine, reduction in existing royalty charges, supply of wood from Government forests, also of electricity and reduction of railway freight on finished products. Mr. Mehta, assured careful consideration of these points, but felt these questions largely concerned the Provincial Government. The production of the slates has been estimated at about 3½ crores and of pencils at 20 crores. There is no unsatisfied demand at present and further production, it is stated, could be stepped u at short notice in response to any increa in demand.

Slate now occupies a favourable po tion in Indian market. But the positi may, however, be undermined by flow goods from without. So now that th industry has a breathing space, it shou do all it can do to improve its qualit and standard. But that will sure depend upon the intrinsic ability and in tiative of the industry itself as also up the active co-operation and assistance India Government.

DEVELOPMENT OF INDIA PORTS AND SHIPPING

To our immeasurable satisfaction v find that Government of India ha launched a vigorous scheme for the dev lopment of India's ports and shippin Government's drive is five pronged e. (1) extension of Major ports of Bomba Calcutta, Madras and Cochin (2) expa sion of ship-building yards at Vizag patam, Calcutta and Cochin (3) est blishment of shipping corporation f handing India's Coastal and Overse Trade (4) development of new ports serve Ocean-going lines and (5) est blishment of naval bases at starting poin on the coast and on the island possesio around India.

The extent of success will, in a larg measure, depend, how far a harmoniou development of all these five facto have been achieved. To achieve an al sided development, all the above fiv aspects have to be taken into account.

As regards the first, readers may b aware that some time back Governme of India had embarked upon a 25 cro project for the expansion and modernisa tion of the major ports. This scheme, w come to learn, has been given top pric rity now and consequently constructio

is stated to be completed within a period of ten to five years.

But expansion of ports without a corresponding provision for ship building yards, will make marine economy lop-sided. And it is surely gratifying to note that the Government have decided not only to expand the existing ship building yards, but also, to create new yards. A Ship-building yard is schemed to be located at 'Trombay.' A 2-5 crore scheme spread over three years has been drawn up by the Bombay Port Trust and is now awaiting approval by the Government of India. In fact, a clear-cut scheme is soon expected to materialise soon after the three French Ship-building experts who have been visiting the various sites in the country, submit their reports. It is estimated that India's present tonnage of mercantile marine is about 400,000 and is quite inadequate for our requirements. Recognising India's needs, the Government of India have set a target of two million to be reached within a period of five years, partly through private enterprise, assisted by the Government and partly through State Corporation. The fourth leg of the Government's great programme is the development of some of the numerous minor ports, littered all along the country's 3200 mile coastline. It is learned that now a team of technical experts of the Committee has concluded a six-month subsoil Survey of four principal ports namely Karwar, Bhatkar, Melpe, and Mangalore.

These apart, the establishment of naval bases is also contemplated and is engaging the attention of the Government authorities. Details of the programme are not yet, available but so far as information goes, Vizagapatam on the East coast and Cochin on the West will become major naval centres. Besides, the Government have, under contemplation, the fortifications of Andaman and Nicobar Archiplego, formerly a penal settlement.

BOOT & SHOE INDUSTRY

SHOE is one of the most important and conspicuous items of dressing output. We know what curious shapes of foot-wear were used in older times and we are also aware that the shoe, like the rest of our dresses, has always been subject to the whims of fashion. But the part that the shape plays at the modern time would be unimaginable, if we were not in posses-sion of all sorts of machines that enable us to produce shoe in any necessary quantity and to manufacture articles of superior quality that satisfy the innumer-able and constantly changing demands of fickle fashion.

The many sidedness of the present day shoe making is due primarily to the fact that the shoes for gentlemen and ladies, boys and girls differ fundamental-ly from each other in shape and external appearance. Though the modifications possible in lady's shoes with regard to shape are very much more numerous than the men's yet the attitude of men towards the indifference of fashion has brought about a great deal of variety in their foot-wear. Apart from children's shoes there are also shoes for special purposes and that every kind of shoe must be obtain-able in a number of different sizes.

Boot and shoe making is the biggest of leather industries and its scope has been expanding with the increase of popula-tion and the higher standard of living. Small factories for boots, shoes, slippers, sandals, can be run by individuals with moderate amount of capital and there is a great chance for individual craft, as a boot made by an individual is considered more durable and more convenient.

Boots and shoes are now-a-days made both by hand entirely as a cottage industry and by means of machinery as a factory industry and both business are paying as crafts.

In either method, they pass throug a number of common operations. Tl difference being that in the hand oper tion one man completes the entire shoe l performing all the operations himse while in factory the work is distribute each operation being done mostly l machine, by different sets of operators.

In this article it is proposed to discu in detail as far as possible all the differe operations of some manufacture so as give a clear insight of this vast industry.

PATTERN-MAKING & DESIGNING

Pattern (making) is the first impo ant operation in shoe making. Upon tl depends the success of this industry to great extent. It may be broadly divid into the following sections:—

(1) Standard construction;

(2) designing, or cutting the se tional parts;

(3) grading, or scaling the parts ir various sizes;

(4) preparation for use in t factory.

Divisions (1) and (2) may again classified under different headings viz

(1) Those which cover the toes a sides of the foot as Court shoes, slippe etc.

(2) Those which cover the inst as walking shoes.

(3) Those which terminate j above the ankle, as boots.

(4) Those which cover the leg field boots, etc.

The production of a standard or o line forme of the upper is the first ess tial, and although in experienced ha it is possible to produce a standard di to the last, better and more satisfact work is obtained by first cutting a fo or last shape.

There are many methods of for cutting recommended, all striving

obtain the same result i.e., to produce a shape which, when transferred from the curved surface of a last on to a flat surface.

To begin with the operation select a suitable last. Then mark a straight line up the front, taking the centres of toe and top of comb as the terminal points, then repeat the same process down the back by drawing a line from the centre of seat to the top. If the last has a plated bottom, so much the better, if not, it will be necessary to mark an outline of the insole in the waist. Now place the outside part of the last on to a piece of paper, *mark the outline and cut out about one* inch larger. When convenient, it is advisable to mould the paper to the last without the use of mitres or cuts, as, however, modern lasts have a considerable amount of depression across the joints and at other points, the paper will not easily bed down to the wood, and it becomes necessary to make a few cuts across the marked outline at places coinciding with the greatest amount of depression.

The direction in which the cuts are taken is important; they should always be perpendicular to the outline. As a rule. there would be sufficient up the front and two in the waist. The paper may now be fixed or held on to the last, when it is turned down to marks already made on the last, carefully moulding as the folding over proceeds. Along the bottom edge. rubbing over may be resorted to, when the outline will be distinctly seen.

The paper is now removed and cut out to the folded or marked edge. An inside forme is next produced in exactly same manner.

STANDARD CONSTRUCTION.

It is our intention to deal as briefly as possible with the construction and design of some of the styles mentioned before. The best method to adopt, however, is to select one that would give the same results time after time, when working to the same forme and measurements. The chief points to be determined are (1) the shape and character of opening for the foot, (2) the means to prevent slipping about in wear.

The height of front should come just above the bend of the foot, over the joint or tread, the height of back should cover the curve of heel bone, but below the bend caused by raising the heel; while the shape of opening must be as high at the sides as possible, consistent with room for free movement of the muscle situated over the instep portion of the foot.

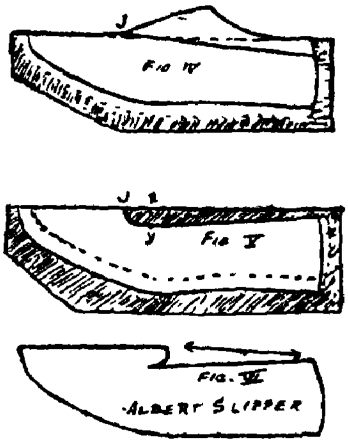
For the novice, certain lines and points based upon proportions of the foot or last may be used as an aid to construction. To obtain a good fit, the first essential is a properly shaped last.

METHOD.

Place forme on the folded paper, the toe end level with the folded edge and overlapping ⅛ in. at J. Mark round the bottom edge of forme from toe to seat and down the back; prick through on to the paper positions of C. and J. add the necessary lasting allowance, according to character of material and thickness of sole (for Turn-shoes).

Remove the forme and from point C measure towards folded edge an amount equal to one-sixteenth of the standard last length as C.B. From J measure along folded edge one-twelfth last length as JX, and the same distance down from X as XY. Join YB and design curve from J to Y (The distance from J to X and X to Y is for firm leathers or fabrics , for very soft and stretchy leathers it may be made one-fifteenth of the last length). Further drafting or shortening of the top line is usually needed and accomplished by taking off a portion at the back; for fabrics and firm leathers ⅛ in. at the top

to nothing at the bottom is quite sufficient, for soft and elastic leathers 1/16 in. to ⅛ in. more, is to be taken off all down the back.



1. Forme on Paper.

SHOE PATTERNS AND CONSTRUCTION

In cutting shoe standards from a forme cut to the last, the first points of consideration are: (1) Height of back, (2) height of front, (3) shape of ankle curve. At the back, they should be the same as in the case of Court shoes, i.e. one-sixteenth of the standard last length above the counter point; at the front, height varies with style and fashion, from a little above the instep point to 1 in. above the joint position. In order to prevent cutting the foot by action of movement at the ankle, the shoe should not extend more than one-sixteenth of the last length above the instep point.

Mark outline of forme, transferring points C.J.I. Mark F and T at one-sixteenth standard last length from I and C respectively. Join JT and from T measure one-fourth of the last length as TK. Cut the curve from F to K, and in cutting out make allowances for lasting over and substance of the stiffencer.

DESIGNING.

Although the designing of a boot or shoe should refer to the completed article—material to be used, method of making, and the last on which it is to be made—it is more usual to apply the term "design" to the division of the standard into various sections comprising the upper.

The different styles common to the trade are known by recognised names, either those of certain people as Derby Lorne, Spencer, Blucher, etc.; or of places, as Oxford, Balmoral, etc.; or by terms describing their character, as Laced, Button, Strap or Bar, Gussett, Opentab, Whole, Three-quarter or Half Golosh.

The simplest division is to design the standard into two parts, such as a vamp and quarter or a golosh and leg; the vamp and golosh may be further divided by a toe-cap.

CHOICE OF MATERIALS

To dwell upon the advantages of knowing how to choose and buy, would be an unnecessary waste of both time and space. To be able to select purchase advantageously the various materials of which boots and shoes are formed, necessitates on the part of the buyer the possession of a complete knowledge of his present and immediate future wants, and a deep insight into the nature and character of the things purchased.

Roughly speaking, upper leathers are classified under several headings:—

(1) Vegetable tanned;
(2) chrome tanned:
(3) tawed:
(4) combination tannages.

Each tannage provides us with leathers having distinct characteristics. A good upper leather must not be airtight, but nearly waterproof, it should withstand bending and tearing strains and be able to resist friction.

Vegetable tanned leathers, especially when stuffed with wax, withstand a large amount of friction; their ability with re-

gard to tearing strain is not so great when compared with some of the mineral tannages of equal substance and quality. neither the flexibility is so great.

Chromed and tawed leathers are most flexible. they do not tear easily, and will stand any amount of bending before being exhausted but their power to resist abrasive friction is not good.

Leathers made by combined processes generally have the characteristic of the first tannage used.

For light or medium wear, a chrome leather answers all requirements, and for hard wear, an ordinary vegetable tanned leather, made in conjunction with a synthetic agent or otherwise, and thoroughly waxed, is probably the most satisfactory.

Sole Leather—Since the quality of sole leather differs with the methods of tannage in respect of plumpness, grain, fleshing and general get up, this should be carefully scrutinised before selecting sole leather for a particular type of boot and shoe. Select hides that have an agreeable smell, a healthy hue, and are moderately clean. Avoid those that are loose on the offal, and remember that unusually heavy necks are a pretty sure index to poor lions. Firmness in the flank, lightness in the neck, levelness in the shoulder, and substance in the butt are the characteristics of a good hide.

Patent—In selecting patent leather see that it is close in the grain pliable tough firm has no stretch in it, and that the patent bends with the grain, in other words, is not brittle.

Kid—Choose that which has a fine clear surface, close grain, and should feel smooth and silky.

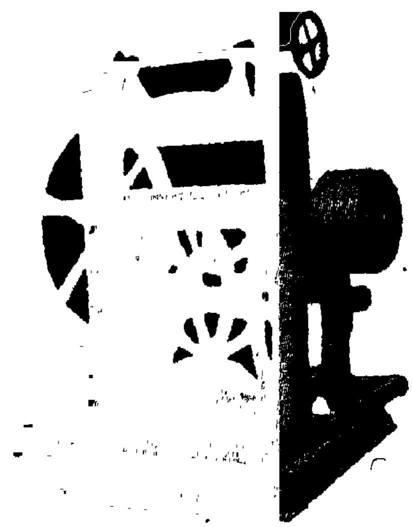
Morocco—In the slipper trade morrocco leather is largely employed.

Linen—In selecting linen and other woven fabrics for linings, care should be taken to avoid those that have been what is technically called "looded."

Threads—The threads most suitable for sewing shoes should be thoroughly tested regarding their strength and durability. The other points to be sought after are smoothness, evenness, and freedom from knots, even though these may be under the surface.

MACHINERIES.

The rapid march of invention is in no trade so forcibly illustrated as in that of the boot and shoemaker. Most of the machines are so perfect that the operator has little to do save to set them going, stop them at necessary intervals, and, in some instances, only feed them. Indeed, their action is so perfect, and the duty of their attendants so simple, that it would be an unnecessary waste of time to attempt to teach. The following is a list of machines required to equip a modern factory.



2. Lining Cutting Press.

LINING CUTTING PRESS

This is almost an exact reproduction of the sole cutting press, and its cutting motion is obtained from eccentrics, the cutting block being carried upon a tray

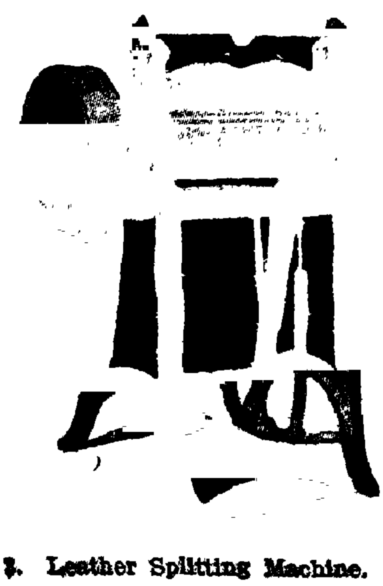
running in and out on wheels. The press has a continuous motion, the block being withdrawn from under the platten in order to the removal of the cut linings and the readjustment of the knife, and returned without any stoppage of motion.

LEATHER SPLITTING MACHINE.

On comparing this machine with the upper leather, it will be seen that no special description of the action of the leather splitting machine is required. It is quite true that there is an immense advantage to be gained from a manufacturer being supplied with leather of a uniform substance when it is intended to be used up for special class of goods. In the olden time the thinning down process resulted in a great waste of material. This waste is put an end to by the employment of this machine, the split off portion, however, thin or thick it may be, retaining from its evenness of substance its proportionate value.

UPPER LEATHER SPLITTER.

This is an exceedingly useful machine employed for splitting purpose. In the event of upper leather, calf, kip, etc. being too thick for a given purpose, its substance can by its aid be reduced without waste



3. Leather Splitting Machine.

by taking a skiving off or fairly splitting it in half. The skin is seized by its edge and forced round a cylinder, the knife meeting it being adjusted to the substance required.



4. Leather Rolling Machine.

LEATHER ROLLING MACHINE

In modern factories the rolling process for hardening leather has long since banished the old method of solidifying by heating. This machine consists of a stout frame work and movable weights attach-to levers, the lower one being easily raised or depressed by movable wedges, the disposition of which is controlled by a shaft with left and right hand screw. The leather may be subjected to the action of the machine in either a wet or dry state.

SOLE CUTTING MACHINE

This machine is provided with a rising running tray to which is secured the cutting board. By an arrangement of inclined planes this board can be raised to compensate for the wearing away of its surface. The cutting motion is obtained by eccentrics. This machine also cuts uppers and linings.

SOLE ROUNDING MACHINE

This machine is used for sole rounding purposes. The leather intended for

soles having previously been cut into ranges, is placed within easy reach of the operator. The sole stuff thus prepared is passed between the pair of templets situated above the led plate, the lower being a fixture. The upper templet is fixed to the cross-head, at either end of which is a side bar with a coiled spring.

LIFT CUTTING MACHINE

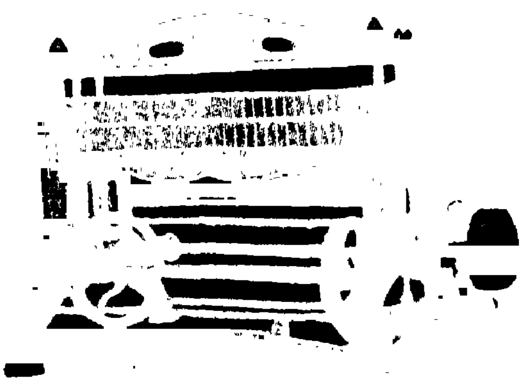
This machine is specially adapted for cutting lifts, small pieces of leather, linen, mill board, or other material.

SKIVING MACHINE

The old process of skiving by hand is not at all satisfactory. This machine possesses the advantage of a simplified action. By a simple operation this machine is easily adjusted to skive uppers to any substance. The changes are regulated by the wheel.

Besides the above machines the following are also indispensable.

1. Rand Splitting Machine.
2. Strip Cutting Machine.
3. Channel Cutting Machine.
4. Sole Moulding Machine.
5. Lasting Machine.
6. Sewing Machine.
7. Stitching Machine.
8. Heel Compressing Machine.
9. Inside Nailing Machine.
10. Edge Trimming Machine.
11. Folding Machine.



5. Range Cutting Machine.

12. Heel Burnishing Machine.
13. Perforating Machine.

METHOD OF CLICKING.

The cutting of upper leathers is branch of the trade referred to as clic ing. Before considering the laying out the patterns, the strain should be cons dered which each part may have to be during manufacture and in wear.



6. Skiving Machine.

The principal strain in the process c manufacture is during the lasting, and th particular strain which affects the uppe most is the heel to toe tension set up wit the first tack. If a shoe is being laste and one of the back quarters stretches i the direction of this strain, whereas th other quarter does not, then as a resu the seams will be crooked; if both quarte in one shoe stretch and the quarters in th other shoe do not, then one shoe will com much further forward on the last than th other, with the result that the caps wi not be alike in depth.

If the vamp is cut with the stretch i the direction of the length, then it will b very difficult for the laster to set up effective heel—to—toe tension before he ha exhausted the stretch of the material, b which time the vamp would have increased so much in length that the vamps woul not match. If the vamp is cut with th stretch in a diagonal direction, then it wil be almost impossible to keep the seam

level; it should never be done unless both vamp and cap are machined to the lining, or otherwise supported.

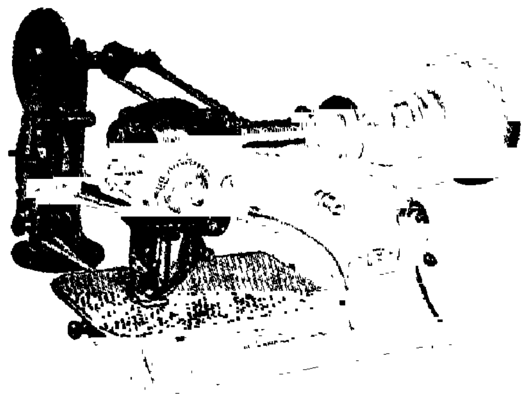
If the toe-cap is cut with the stretch in the direction of the length, there will be a great difficulty both in setting up the heel-to-toe tension and in lasting the toe.

In practice it is usual to cut the parts with the lines of tightness going from heel to toe, unless special precautions are taken to counteract the stretching; but the strain to which the different parts will be subjected in wear ought not to be overlooked since it indicates where the best material should be placed. For instance, the top edge of a shoe is subject to much strain in wear and weakness might result in the shoe quickly losing its shape, whereas there is very little strain at the bottom edge which is lasted in, since in wear the material is supported with the stiffener; therefore the poorest part of the material in any shoe quarter should be placed there and the best should be at the front end.

The vamps should always be out of the strongest of the material, since the constant flexing of the foot at the joint is a severe strain on the leather; furthermore, it is often subjected to considerable abrasive friction at the joints and its edge where it meets the sole should be able to resist water-penetration while if a toe-cap is to be used the cap and adjoining part of the vamp should be similar in quality; if it is not possible to place the vamp so that all its parts are uniform in quality, the poorest part should be in the extreme end of the wing. When the vamp is cut through and toecap is also used no evil could result from a small defect which would be covered by the cap.

Toe-caps should be cut from firm material, but as they do not get as much strain in wear as the vamps they need not be too stout. They also have the support of the toe-casing and do not get any flexing, unless the caps are very deep.

The material should be firm since the strain during lasting generally stretches it and with tan goods this would result in the cap becoming lighter in colour.



7. Parforating Machine.

Button-pieces should be cut tight in the direction of the button hole, otherwise they might quickly lose their shape.

Tongues should be cut "tight" in the direction of their length because of the tendency for them to be stretched.

SYSTEMATIC CUTTING

Before studying the actual disposition of the patterns on the leather, attention should be directed to the rules which facilitate economic cutting; it is often found that by placing the patterns in certain positions not only can they be cut with minimum wastage, but the shape of the material left is such that the same disposition of the patterns can be repeated, and when this is so the arrangement is termed system. The underlying principles of clicking should be thoroughly studied, if good results are to be assured. They may be summarised as follows:—

(1) Fit straight lines to straight lines.

(2) Fit curves to similar curves.

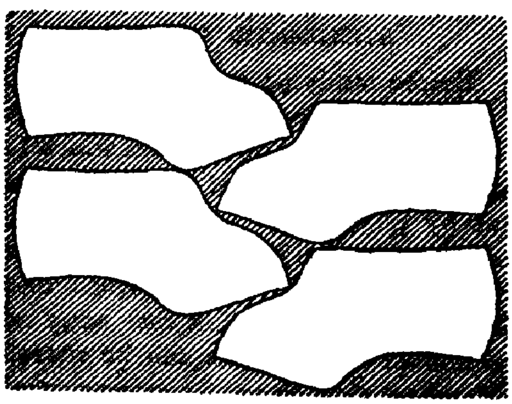
(3) Always aim to have a straight line edge of the material.

If two systems are equally economical but only one of them enables you to cut the work in pairs, then that one should be selected.

Accompanying diagram illustrates a method of placing shoe quarters; its disadvantage is that they are all for one side, whereas by placing them as in next figure they might have been cut in pairs. These systems, however, only land themselves to patterns designed for shoes carrying high heel usually have a curved bottom line.

Vamps may be arranged by several systems; the diagram Fig. 11 shows vamps without caps, the toe of one being fitted into the cue of another; it is best adapted to vamps that are cut for lasts with narrow toes, the wings being opened to assist the system.

Another method is shown in the figure where the wing of one fits into the opening of the another, but such as have the toes cut off may be placed as in figure 9.



8. Shoe Quarters.

Leather, however, varies so much in substance, quality, and the direction of the stretch, that it is not possible to adhere strictly to either of the systems shown; there are therefore some general methods which we now describe appli-cable to different kinds of leather and patterns.

GENERAL METHODS OF CUTTING

There are three general methods of cutting:—

(1) The exhaustive;
(2) The selective;
(3) Combination of (1) and (2).

By the first method the material is completely exhausted. The skins, or sides after being sorted, are cut up into the kind of work they are most suitable. A large number of patterns are required as every available piece of material must be used up. By the use of this method, the necessity of sorting after cutting is essential, otherwise most of the uppers would be anything but uniform in quality of appearance.

The selective method is used where quality of work is the first consideration. The leather selected should be of good quality, and only the best part would be cut, the inferior portions would be used for other purposes.

The third method, a combination between the two former, is in practice, the most adaptable to ordinary conditions. The leather is selected as near as possible according to the quality and class of work required in bulk.

PREPARATION FOR CLOSING

After cutting and assembling the various sections of uppers the next operation is to prepare the sections for fitting and machining together. This may include marking, skiving, folding edges, perforating toe-caps, fixing on backers, pricing, etc.

MARKING

It is necessary to work the facing with a blunt instrument if a row of stitching is required; the facings are often of fancy design and could not be done with any

uniformity without being marked. Where cut is done by machine, the marking could be done at the time of cutting, by having a marker included in the knife. otherwise it must be done by hand by means of tracing pattern.

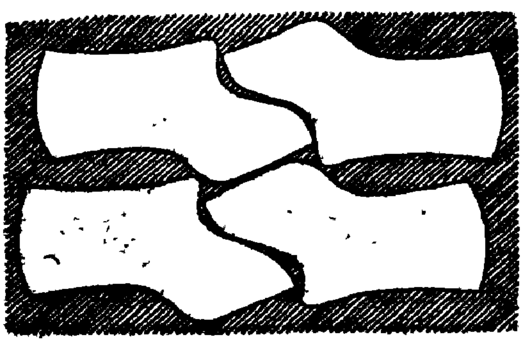
In most cases, however, especially with ladies' boots and shoes, the row of stitching is dispensed with altogether.

SKIVING

For appearance, comfort, and strength, the edges of the different sections of the upper are generally reduced in thickness before being machined together. This process is known as skiving. If this is not efficiently done the seams would be too bulky and the uppers very uncomfortable in wear.

To obtain the best results in closing the skiving must be done efficiently and skilfully. Uppers may be made with various kinds of edges; different seams; and cut out of material vastly different in nature; therefore the skive must be regulated to suit all these varying conditions.

Formerly skiving was done by hand; but now this is very rare, fit being now performed by machinery of which there are two types in general use. The knife in "Marvel" machine is a circular disc but in the "Fortuna" it is cylindrical and rotates at right angles to the direction of the few, which is from left to right.

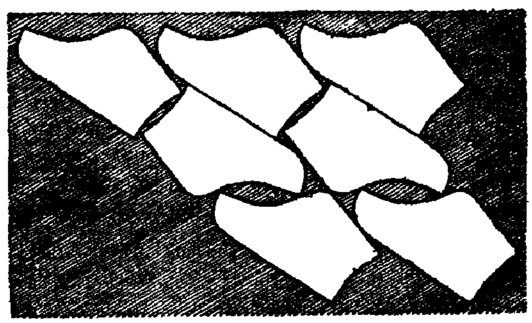


9. Shoe Quarters Another Arrangement

The majority of uppers produced now a days are made with folded edges. After skiving, the edge to be folded is coated with a thin layer of rubber cement, the depth of the layer covering the part skived. The operation is also better and more cheaply done by using a cementing machine, which spreads the solution evenly and does not use more than is required.

FOLDING

The actual fold may be made by machines of two distinct types, one type, known as the "Booth" and "Boston" folders, work by means of a template, shaped to coincide with the shape of the part to be folded; the whole edge being turned over in one operation. Another kind of machine, like the "Lufkin", folds the edge in small sections; in this case the part to be folded is placed against a gauge cutting a small section and folding it at the same time.



10. Cutting Side Leather.

PERFORATING

Perforating is the row of ornamentation seen along the upper edge of toecaps, or round the edge of vamps; sometimes on the other parts, too. If the design is in harmony with the upper, perforation helps to set off the appearance of the boot.

Perforating may be done by machines of various kinds. For toe-caps, a template shaped to coincide with the curvature of the cap, and having the necessary

pins, of the design required for perforating the leather, is placed in a kind of press which forces the pins through the material: a machine having a similar action to a sewing machine could be used.

Other items included in the preparation of uppers, such as fixing backers, colouring edges, pricking, etc., are so simple that very little description is required.

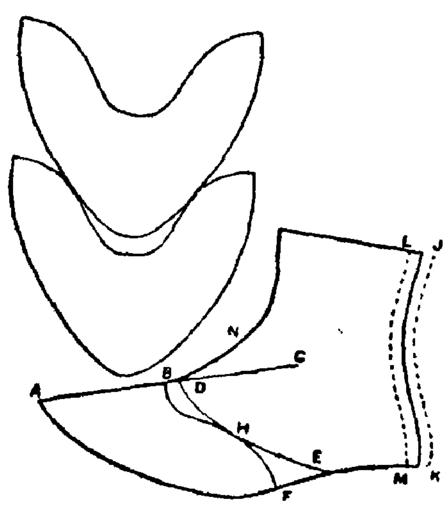
COLOURING EDGES

In the case of raw edges, it is advisable to ink or colour them according to the shade of the leather. A small quantity of gum solution should be added to the colouring medium, to prevent the colour to dry with a polish, and not dull, as it otherwise would.

Having prepared the various sections in the manner above described, they are assembled and made up into lots corresponding to the order and then make ready for the closing operations.

CLOSING THE UPPERS

After clicking the different sections of the leather are sorted and marked. They are then stitched together to make up uppers. There are three typical methods of closing the uppers:—



11. Cutting Vamps.

(a) Paste-fitting on the flat;
(b) Paste-fitting on the round;
(c) "Held-together" method.

With the first method the sections are kept in position by an adhesive, but the partly made upper, instead of assuming the shape which it is intended that it shall be, is laid on a flat slab during the fitting operation: there can of course be no objection to toe-caps being fitted to vamps by this method, and when shoes have a fancy golosh which extends to the top this may be attached to the insertion on the same principle, but if the outsides are fitted to the lining by this method it often results in the linings being too full; this can be demonstrated with a strip of fairly stout leather and a piece of lining; place the strip of leather over the lining—keeping both quite flat—and machine the leather to the lining at each end; if this strip is now bent, as the top of the boot would be, it will be seen that the lining is too full, which shows that the flat method of fitting is not advisable for the legs of boots

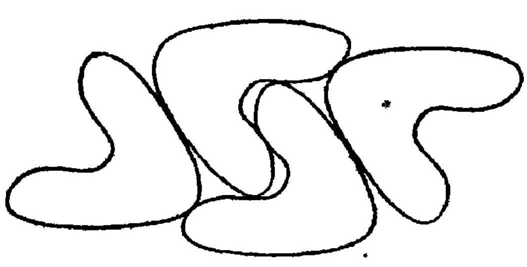
When work is fitted on the "round", a block is used somewhat similar in shape to a boot-tree, or last with a leg attached and if the lining is placed on this, the outsides being afterwards fixed to it with an adhesive, then, even though the lining pattern may not be perfect, yet a smooth-fitting lining is almost certain and even the fitting of whole goloshes is comparatively simple if done by this method; consequently it is still adhered to for high-class work where cost is comparatively unimportant.

The most popular method is that known as the "held-together" system; as its name suggests, all adhesives are discarded, the parts being held in position while being machined; it must be conceded that many parts of the upper can be put together this way quite as successfully as though they were fixed with an

adhesive. The success of the system, however, depends upon the correctness of the patterns coupled with a sufficient number of guide marks.

In the processes of closing lace boot uppers the order would be as follows:—

After the preparation of parts, facings would be stitched on and the linings joined at the backs for each style a special machine is used, where necessary guides are fitted for the edges of the linings and also for the tape. The topbands are next attached either with plain or fancy stitching. While the linings are being prepared, the covers, skiving, inking edges, fancy punching, and stitching caps to be vamps must be prepared in the meantime. The legs should have the facing line marked. The backs should next be closed since this would trim off everything beyond the stitching which exceeded the fixed allowance; it thus ensures the seam being in the correct condition for the success of the subsequent operation of "rubbing down" and "silking"; the former operation is performed over an iron rest curved somewhat like the back of the leg, the rubbing being performed with the aid of an iron rod having a universal joint at one end. If the seam is first damped it facilitates the operation, better results being then obtainable. The silking should be done on a special two-needle machine having a foot with a guide which travels in the groove formed by the junction of the two backs and a device for holding and guiding the tape which is by the silking fastened on the under side.



12. Another Arrangement for Vamps.

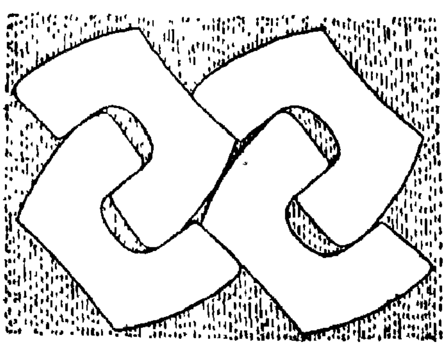
The details of the remaining operations will be varied according to the method of closing and style of upper. If the covers have a folded edge then there will be a raw-edge leather facing and topland; the lining should preferably be placed on the block, and an adhesive having been applied to the margin of the covers, they should be fitted over the lining—if the adhesive is omitted the work will have to be held in position. The folded edge of the upper should now be stitched round using a machine with an under-trimming knife attachment set at an angle of 45°, which will trim off the excess of the facing and topband which projects beyond the folded edge, and by trimming at so great an angle the greatest possible neatness is obtained.

If, however, the upper has a turned in front and bagged top, then without using an adhesive the face of the lining will be placed in contact with the face of the outsides and the top of the leg be machined along; when this has been done the upper will be turned so that the face of the leather will be outside. If the top of the upper is cut straight it will go to the beader, and afterwards be ready to be stitched round as already described.

The lining from the bottom of the quarters to the toe should now be closed and opened out flat, after which the quarters should have a bar, or stay, put across just above where the edge of the vamp will come. A zig-zag machine may be used for this purpose if the feed is thrown out of action, otherwise special machines are supplied for the operation. The object of the stay is two fold, since it draws the two sides of the upper close together and thus makes vamping easier, added to which it reduces the probability of the vamp breaking when the last is either slipped after making, or reinserted for channel

losing. Sometimes the bar is dispensed 'ith and a fold of tape placed between ıe vamp and the quarters, at other times ı oval-shaped piece of leather is used, ıe latter being usual in the cheaper quali-es of men's work; some manufacturers, ıstead of putting a stay, wait until after ıe boot is vamped and then put a short ›w of machining not on the vamp but ose to its edge, thus fastening the tongue ı the quarters. The vamp may now be ted in position, first folding it to mark ıe centre of the opening or front curve hich must be put where the quarters eet; the vamp may be kept in position ith an adhesive or it may be held while is being machined, the former being pre-rable.

In the machining of the button boot ıe order of processes would vary from ıe foregoing; supposing the top is to be agged and the button-piece folded, the ›llowing method may be adopted; the utton-piece having been folded is fitted the button-piece lining, the button holes ıay now be worked, after which the utton-piece—not the lining—may be losed on to the inside quarter, then open-d out and rubbed down but not silked. ıe backs may now be closed and silked, utton-stays fixed and buttons put on; 'hile this has been proceeding the backs f the linings will have been closed and ›pbands put on: the upper is now ready › be machined along the top and opened



13. Lock In Vamps.

out as described for the lace boot; then putting the lining smooth in the back of the boot, silk the front seam so that the edge of the linen lining is lapped over by the edge of the leather button-piece lining, both being kept in position by the silking. The edge of the linen lining by the buttons must now be folded in and then the entire edge may be machined round, after which the toe of the lining must be joined and the button-piece then fastened in position, after which the vamp can be attached.

Men's counter-lined Derbys with outside back-straps and half watertight tongue go through different processes. After the preparation of the parts, the backs are closed with the flesh sides of the leather; the side linings are next joined in the counters after which they will be machined to the outsides; this is done from the inside of the upper so that it is the shuttle-thread which appears on the outside, consequently a lock-stitch is always used and care taken that the top tension is sufficiently tight that the shuttle-thread (on the outside) does not appear as a straight line. The tongues are now stitched to the vamp, the latter being generally put on top; the lap must be sufficient for strength (especially at the corners), after which the tongue must be slit, so that it can be turned up and attached to the quarters; a better method is to put the tongue on top of the vamp since there is then greater probability of the corners being watertight. The facings can now be machined on, and in so doing the sides of the tongue must also be caught under the facing, after which arrange the fold of the tongue by the vamp, and place the tab of one of the quarters to the guide-mark on the vamp; it is then ready for machining; the other side can now be similarly fitted. It will be noticed on one side the machining must be commenced

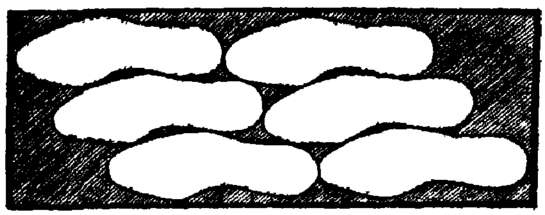
at the tab. but on the other side at edge of the vamp, because the pressure-foot must rest on the quarters.

Ladies' shoes require other processes. Those which are to be turned in round the top should, after skiving, be closed at the backs before folding, otherwise the seam will have a clumsy appearance; the marking of facings will be the same as in boots. Since the covers are folded there will be a leather lining (which will be raw edge) with probably a linen vamp lining; the quarter linings will be closed, opened, and rubbed down, after which they can be machined to the outsides using the under-trimming machine. Having put the bar across, the vamp lining can be attached, placing it between the quarter and the quarter lining, and working with pressure-foot on the inside of the shoe, so that the stitching can be placed on the edge of the leather lining; the latter will have to be slit near the front of the shoe, as the row of closing will make it impossible to slip the vamp lining between the quarter and quarter lining; this however, will be covered by the tongue, which can not be conveniently fastened in; the vamping will be as for a boot. When shoe quarter linings are cut so short that it is not possible to join the vamp linings to them after the quarters and quarter linings are stitched together, it is necessary to join the linen linings to the leather quarter linings before stitching the latter to the outsides, in which case a seam down the front of the vamp lining cannot be avoided.

CUTTING OF BOTTOM AND OTHER SECTIONS

Before actually going to deal with the description of different leathers to be cut up we must first consider what pieces may have to be cut and the characteristics each should possess.

For most of the methods of direct attachment an insole is put on the bottom of the last, and the edge of the upper folded over on to the insole; tingles are then generally used to hold the upper in position until the rest of the bottom is secured. So that tingles can be used, the insole must have sufficient substance that together with the upper it is nearly equal to the length of the tingle; it must also be sufficiently close in texture that the burr of the tingle is not pulled through by the strain of the upper; which will vary according to the substance and harshness of the material used in the upper and to some extent according to the tension used in lasting. There should be sufficient solidity in the insole for it to life flat on the bottom of the last, even though the upper be harsh, but if it be either too thin or too soft it will not do this.



14. Punching of Soles.

A second useful purpose served by the insole is to keep out the sides of the upper; even though the material may be stout or harsh; and show the outline of the bottom of the last on which it was made. If the upper is of soft material this will not be a severe strain on the insole, but it may become considerable when the uppers are stout and hard, such as waxed kip; or waxed split.

The third useful purpose served by the insole is to form a foundation to which the rest of the bottom can be attached, hence the character of the material required will necessarily vary with the character of the attachment.

Insoles may be "self-backed," that is two insoles may be pasted together and used for one.

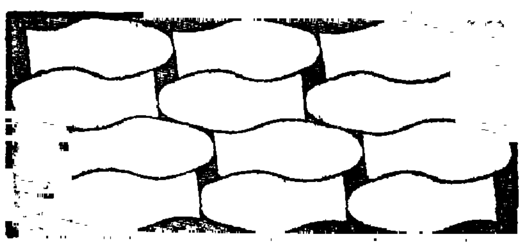
For cheapness, light leather insoles are often reinforced with fibre board, sometimes fibre board with canvas backing is used, or even plain fibre from one, or both; of two causes. (a) The material may give way through fatigue at the place where the shoe is flexed when in wear; (b) perspiration from the foot may destroy its ability to hold the method of attachment.

When leather insoles are reinforced with a material inferior to leather, the the inferior material should be put where it will have to bear as little strain as possible. In walking the friction of the foot would soon wear away felt, therefore the leather should be put next to the foot.

Fibre board cannot endure damp like leather; neither can it hold either the stitch or burr of the rivet as strongly as leather can, therefore they should not be put next to the foot.

The "stiffener," or "counter," is that piece of material which is put into the back of the shoe usually between the lining and the outsides. Several reasons are assigned for using it, the most usual probably being that it keeps the foot in its proper position in the shoe, and thus prevents the heels being worn down on one side; by causing the weight of the body to fall perpendicularly over the centre of the top-piece.

Ideal stiffeners should be made from solid leather, but two factors, economy of material and cost of production are responsible either singly or in combination for substitutes being frequently employed.



15. Another Arrangement of Sole Punching.

The following materials can be used for stiffenings:—

(1) Solid leather. (2) Pigskin. (3) Leather self-backed. (4) Leather canvas-backed. (5) Leather fibre-board backed. (6) Fibre-board and canvas. (7) Fibre-board. (8) "Leather layers," or "pasted stock."

The material which is put into the toe of the boot to cause it to retain the shape of the last is known by various names as "toe-puff," "toe-casing," "toe-box," or "toe-stiffener."

When in the process of lasting an upper is strained over the toes of the last, it stretches considerably, and when the last is withdrawn it would contract so much that the toe of the boot would no longer resemble the toe of the last; therefore it is necessary to put into the toes of the boot something that will not contract; and which has also strength enough to resist the contracting tendency of the material in the upper.

A strong toe-puff is also necessary to enable the line of tension from the heel to the toe to be set up.

The principal materials used to form the toe-puff are:—

(1) Pik-skin. (2) Insole belly. (3) Split Leather, (4) Celluloid, (5) Fibre board. (6) Box toe gum and cements. (7) Felt.

The piece of material which is placed on the bottom of the boot when it is lasted and which covers the forepart immediately beneath the sole is known as a "middle-sole," it being placed between the inside and the outsole; it is also sometimes called "slip-sole," "tap" or "half middle sole."

The middle sole may be cut either from bellies, shoulders, or the poorer parts of the butt. It is not subjected to the same strain as the sole, and therefore its quality need not be as high; sometimes split

leather board or wood (pulp) may be requisitioned.

It is usual to put into the waist of the canvas shoes and the slipper trade; even leather is used either from bellies, shoulders or bends, while in low grade work "leather layers" may be employed; but in boot a piece of material which is called a "shank," whose function is to assist in preserving the arch in the waist of the boot. The amount of strain to which it is subjected will depend upon the similarity between the shape of the waist of the foot last and the waist of the foot when supporting the weight of the body. If these are exactly alike, then so far as the shape of the boot is concerned a shank will not be necessary; in ladies' lasts it is not often that there is much similarity, except in those designed to carry very low heels.

Another useful purpose served by the shank is to prevent the waist of the sole being broken when the boot is being slipped off the last.

Special shanks are often used in boots designed to be worn either when digging or when climbing ladders, in order to make the waist rigid, and thus by distributing the force to lessen the strain on the waist of the foot.

The sides of the shanks should be bevelled down, since if this is not done the method of attachment may cause the sole to sink and it would then be difficult for the finisher to finish the waist properly.

The principal materials used are:—leather, wood, fibre-board, steel, steel and wood, steel and fibre-board.

Unless they are made of leather, shanks are purchased by the shoe manufacturer; cut and moulded ready for use.

Soles and heel top pieces of boots and shoes are cut from the butt or bend. Soles for slippers and turn shoes may be cut from shoulders and heel lifts fro[m the] belly.

Before the leather can be put [into] the presses which are used for cut[ting a] certain amount of preparation is re[quired.]

ROLLING

Rolling is only a substitute fo[r ham]mering, and cannot condense the l[eather] to the same extent, because the fib[res are] set at an angle by the action of [the rollers] and have a tendency to resume [their] normal position when the leather [is allowed] to dry out. To obtain the best r[esults the] rollers should have a reversible [action] and one cylinder should be ma[de of] brass or gun-metal to prevent st[aining.] The leather, also, should be [passed] through and back again in the op[posite] direction. All leather is not impro[ved by] rolling, and great care must be tak[en not] to apply too much pressure on [fine] grained leathers, otherwise it wo[uld be] impossible to get a satisfactory fini[sh.]

Methods of cutting bends va[ry in] different localities. Some range o[r strip] across previous to cutting out the [soles,] others cut direct. Ranges are conv[enient] to use, but unless the sole shapes ar[e fair]ly straight and are cut without [waste] they are not economical to use.

RANGING

The best place to commence ra[nging] from will depend upon the use to [which] the fore-end of the bend can be [put.] Some manufacturers find it imposs[ible to] use the fore-end, because the sub[stance] or quality is not suitable for their [work;] others, probably doing a mixed [class of] trade, could use it without difficul[ty. If] the fore-end is satisfactory, str[ipping] should commence from that end; [on the] other hand, where the fore-end can[not be] used, stripping will commence at th[e butt] end, *the remaining portion being s*[old for] other purposes. The bend is u

ranged across, and the width of the strip is cut equal to the size of the particular sole required.

Ranges may be cut straight or waved, according to the style of sole to be cut. If through soles are used, and the shape is not twisted, a straight range would cut without much waste. But if soles with straight grafts are used and cut from the same shaped range, the amount of waste would be at least 10 per cent. more than if the soles were cut through; yet, with a curved or waved range, the straight grafted soles could be cut satisfactorily. A straight range with a curved graft is likewise unsatisfactory; a curved range only being suitable. There is very little skill required in cutting up ranges, the soles being cut as close as possible across the range, starting from the side of the back-bone. It is usual to place the inside joint of the sole where the leather is slightly inferior in quality. This can hardly be considered sound practice, because the greatest pressure and wear is usually found to occur from the ball to the end of the large toe; hence it is advisable to place the outside joint near the back-bone edge. If ranges are cut from a butt, cutting would commence at each side of the back-bone.

DIRECT CUTTING

In the largest and most modern factories, direct cutting is the method usually employed. There are many advantages of this method over the one just explained. When cut direct, there is no stripping required, the whole bend being placed under the press and the soles cut out one after the other at a rapid rate, and small pieces of waste are avoided. ...ere many different toe shapes and ...s are used, soles are not always cut ...exact shape or fitting, but are cut ...what is termed a master shape: ...ne that may easily be converted to the shape required, by means of a block or pattern in conjunction with the use of a rounding machine.

PRESSING AND GRADING

Presses chiefly used for cutting out bottom stock are known in the trade as "revolution" or "open end." The old type press with an eccentric motion used to be known as a box-press. The best was enclosed by four posts in a very small area; which prevented the possibility of cutting any large piece of leather. The "revolution" press is built on somewhat similar lines, but the bed is formed by a cutting block several feet long. This enables the cutter to accommodate a whole bend or belly on the block, and the press is put into motion by means of a clutch action with the depression of a treadle which extends the whole length of the machine.

After cutting, the stock must be sorted for substance and quality according to the requirements.

LASTING

Lasting is the name given to a series of operations that assist in attaching the upper to the insole, previous to the attachment of the bottom. In the last upper is laced up as far as the bend or throat—that is, where the eyelets finish and the hooks start. This is done to prevent it flying open while it is being lasted and sewn. The stiffener can be pasted on both sides. Judge the half of it, and put it into the upper between the lining and the outside, letting the centre be against the back seem of the golosh.

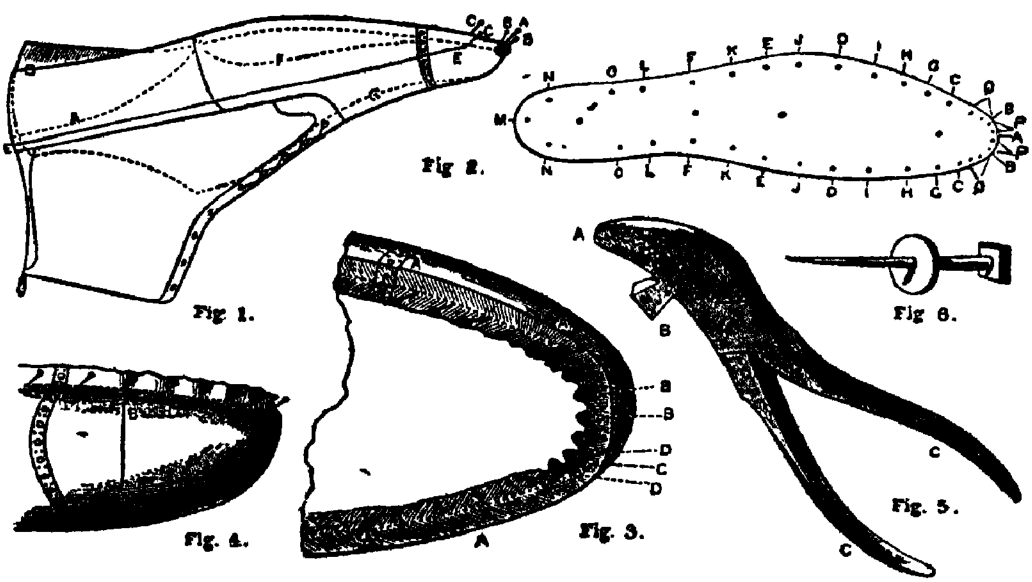
Now place the last upon the knees, inner sole downwards, with the heel to the left and the toe to the right. Place the top on the last, and pull it over at the toe with the right hand; place it at the back, so as to get the back seam exactly

in the centre of the back of the last, covering at this portion only about two-thirds of the last. This is called "horsing". Then turn it over, bottom upwards, holding the toe firmly with the right hand; place the heel between the knees, change the left hand for the right at the toe, and, with the pincers in the right, draw the toe of the upper over the toe of the last very tightly, taking care that the back seam and centre of the vamp and toe are quite straight on the last. Then hold the upper firm with the left to where you have pulled it, and place the forefinger on the spot where the pincers are, and hold it there till you can put your first tack in at A. This is the plan of the sole of the last with the tacks numbered in alphabetical order, to show each time a tack is put in, and which is the proper order to put them in.

The leather is then pulled over and a tack put in at B and B, each time working a reasonable and equal portion of stuff between each two tacks. These three lasting tacks—in fact, all tacks in lasting—are put in right through everything, and into the last enough to keep the work solid; for although they are there only temporarily, they have to remain till the boot is sown and the stitch takes their place.

Now, if the upper be quite straight upon the last, the next two tacks to be put in are C. and C. These are called draft tacks, as they put and keep what is called a draft in the boot or shoe. This draft is got by pulling hard with the pincers in a direction from the top of the stiffener, as shown by the line E.E. It is also to get this draft that the upper is hoisted at the back, for when the whole of the fore part is lasted, and the back or heel of the last knocked down into its place, it must necessarily form a line of tightness at E.E., and it is this line of tightness which is called draft. The side linings are now put in between the lining and outside, only they are not pasted; their position is indicated by the dotted line, F.

The prime principles of lasting are tight lasting, the drafting out of all the wrinkles and pipes at the toe and C, and equal pull at all parts—one side equal with the other—for it is this evenness of lasting which makes the boot look clear



16. Lasting.

and set nicely when it is finished. If lasted properly, it will look, when the last is out, as though the last had not really been withdrawn.

The two tacks, D and D, can now be put in—they will hold the side lining firm: and while lasting up the sides or round the heel, you must always see that you get the lining lasted tightly; otherwise when the boot is finished it will set in puckers and hurt the foot.

It will be seen that the top does not touch the last at G. but it must be lasted, first on one side and then on the other, until all this foulness is away, or you will have your work a size too large when finished.

When you have got all the tacks in the fore part as far as EE, the heel of the last can be knocked down into the upper until the bottom of the golosh is just above the insole, for at the seats it does not need much to last over. Sewn seats and pegged seats will be dealt with later on. The waist and seat can now be lasted similarly to the fore part, but these need not be pulled so hard, especially the waist. In fact, in the case of a shoe it will only be necessary to pull it over with the thumb and finger, or you may pull all the draft from the quarters, and thus make them baggy at the sides in wear.

Now you have the last in the upper, and, with the exception of the toe , the boot is lasted. We will now proceed with the toe, which can, after you have got the first three tacks in, be very well left till the end, if you do as has been described. You will have gained practice and confidence, and this will enable you to spend as much time as you can spare upon the most important part toe, which, if not well and properly lasted, gives a boot or shoe, both before and after wear, a very ungainly appearance.

In lasting a toe there must necessarily be a lot of wrinkles, and as you put in each tack a "pipe" forms between it and the one next to it. Now, to last a toe properly, as much foul stuff must be got round the toe end as you possibly can, and this is where it must be lasted away: which means that you must pull as much stuff to the toe as you can in putting ine draft tacks. All must be lasted away between them, dividing the staff as equally as you can between A and B and B and A, and also between B and C on either side. The two parts, P and G, will take a little care to last them well, but, as I have hinted, negligence here causes great defects before wear; because, if these wrinkles be not lasted out, a dreadful appearance of unevenness is given. Then, after wear, the tow falls in, and this sometimes all on one side. Thus, if the toe be lasted well at the outset, it will keep up and look smooth till the boot is worn out.

In lasting, the next thing is to tap the upper all round, with the hammer at AA and A. This will hammer out all the wrinkles that the "pipes" have caused in this region, and will have to be done each time a tack is put in or altered on the top.

Previous to putting in each tack, the leather must be pulled quite hard. This is done according to the substance of the tops; the stouter they are the harder work it will be to last them. Fig. 5 shows a pair of shoe-maker's pincers, A being the the jaws with which to hold the leather while you lever the leather over, making B, the fulcrum, rest on the inner sole, while you pull and press upon the handles C and C, holding them quite firm, that you may have a proper grip of the leather. When it has been pulled enough, hold it in its place with forefinger of the left hand until it has been made secure with a tack or rivet.

It often happens in lasting a toe it is harder to get a wrinkle out clear than it is to manage a "pipe", because if another tack is put in the centre of the pipe—that is, between two tacks or the two wrinkles which two tacks have made —at BB, this tack will help to last the pipe out. Then with a tap or two with the hammer it can be got clear away. Either of these means is useless for a deep wringle. The tack that has formed the wrinkle, as C, must be taken out, and an awl put under to push it out, so that a "pipe" is formed. The two tacks must be put in at B and B, and then the pipe can, as before, be tapped out easily.

When there is a toe-cap, the vamp should be lasted first. The toe-cap can be turned back while this is being done as far as the line BB. The vamp can be treated as above, and should be done as well as if it was not going to be covered up with the cap; in fact, to give it an extra fine finish before the cap is put back into its place for lasting, the vamp can be lightly filed or rasped round in front of the tacks at C, C C on the top, and at D.D. round the edge, and then hammered again at both places. This will make an even surface to last the cap upon.

In hammering the upper, do not give heavy blows, but, as I have said, only "tap" it. This can be done well all round the boot, especially at the toe, where there is a double substance, at the sides, where the side linings are and at the heel, where are the stiffeners. This will all help to keep the boot in its place when made.

When a top is very hard to last, and there is difficulty to get it close down to the last in front—especially if the last is very hollow here, or the tops are heavy—it is best to last it down as follows:—Take half of a pair of medium welts (a half is quite sufficient, and then the remaining half will do for the other boot), and make a hole in one end; then get two sole tacks or two large lasting tacks; cut two little round pieces of stout sole leather, and drive the tacks about half-way through. Put the end of the welt with the hole in it at one side of the boot, and nail it there with one of the tacks, knocking it in down to the round piece of leather. Hold the boot firmly with the left hand, and pull the welt on the other side with the pincers, letting the piece of welt come right across the vamp, and when you see you have got any of the foulness away, put a tack in the vamp, or put the other sole tack in through the piece of welt and vamp as well, until you have put a tack in each side of the piece of welt, that you may take out the sole tack and liberate the welt while you are trying again to get more purchase, and the upper tighter to the last. This system is also very good for the waist when that is hard to get in. Although you adhere to the same principle, however, the mode of treatment is different for in lasting the fore part, if you cannot get it tight enough with the pincers, you can give the two sole tacks a knock sideways, which will send their heads near; together over the inner sole, and so tighten the tension of the welt. In the waist the welt does not go over the upper; but simply across the inner sole, from F. to F. To tighten the upper in this case, you must put a chisel or file under the welt, and gently lever it up while you knock the tacks sideways, but the tack must not only be knocked aside, but at the same time be sent a little further in. This, as this tack has the piece of leather on it, will present the tack from breaking away from the upper.

FITTING THE WELTS

With regard to the welts, these should be divided into two long strips, and quite

wet. A further explanation of their preparation is appended below.

You first want what is called a welt mill. This a tool that does not cost much; is a very handy one; and would be rather hard to make. Both sides of it have graduated steps, which must be equal one with the other on each side. It is a piece of brass or zinc on a block of wood; having the brass standing up on each side and formed into steps. It is placed upon the knee; and the strap must then pass under your foot, over the mill. Then, by heavily pressing down the toe, you will be able to hold the mill firmly on your knee. This is generally done on the left knee. Then you want your quite sharp knife, with a keen, not a rough edge. The welt must be laid on the flat of brass, between the top racks; grain side downwards; with about a couple of inches hanging over the front. You then pick two of the ratchets, one on each side, and lay the knife in them, the edge being in their deepest corner, holding it there very firmly or you will blunt the knife should the pulling at the welt shake it about.

You pick the ratchets high enough to just admit of the blade of the knife pressing into the welt; in order that you may take off only the smallest possible shaving at a time. This is done by holding the knife with the right hand, and pulling the welt with the left until the shaving is taken off. Then reverse the welt, take it in the left hand, place the knife in the same position; and take a shaving off the remaining portion of the welt.

For most work, it is well to take the finest possible layer off the grain side, and this is very easily done by repeating the above process, this time with the grain upwards, and with the least possible extra pressure on the knife.

If the welts bought are of the proper substance, this will be all that it is necessary to take of them; but if you want them lighter take them down from the flesh side by the same means as above described, going down a rack at a time (one each side) till you get them the required substance.

The welts next need to have an angular piece taken off from the grain side the whole way down. This is about two-thirds of the way through and about 3/16 in. wide.

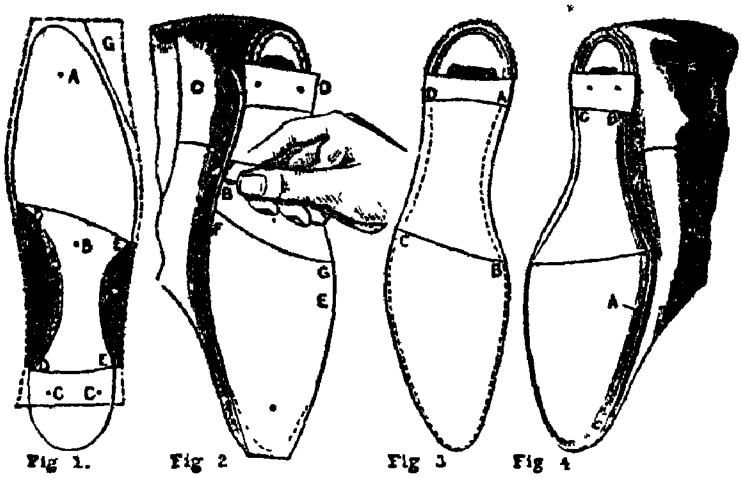
This proceeding will show the welt when turned over—that is, grain side down—with an end; and this is the position in which it is held while it is being sewn in for the boot.

If this piece be skived for about 2 in., the best way to take the remainder off is by digging the point of the knife into the cutting board, at such an angle that the welt can pass between it, the board, and the first and second joint of the forefinger of the right hand. Then, when the welt is pulled, with the left hand, this angular piece will come clear off.

Now suppose the boot to be between your knees, toe towards you, you start sewing in the welt at the left corner of the seat, up the waist. If it be the right boot, this side of the waist (the inside) will be the longest. Whichever it is, it must be measured from this point—namely, with the welt—to just the corner of the joint at this point, in order to know the length it is to be in the waist; you skive the welt down for this distance to about half the substance, taking the skivings off from the grain side. Then the welt is ready for sewing in.

METHOD OF FITTING THE SOLE

The sole has to be wetted, and dried until it is just mellow, then hammered from the centre outwards. In this condition it is pasted well over on the flesh side. The bottom of the boot must have



17. Fitting The Sole.

a coat of paste, and French chalk should be sprinkled over the felt; etc., to prevent the boot from creaking. A sole-tack is put in the centre of the toe, as at A, one at B, and another one at C and C. Here the sole is tapped down all over with the hammer, and the boot held firm on the knees, by letting the strap pass across the centre of the waist; a little below B, and under the left toe. The waist at either side should be manipulated with a round headed hammer, called a waist or cramp-hammer.

In very strong work the waist of the sole is left to the full substance; but this depends greatly upon the wear such boots are to be subjected to, and also the special desire of those who will have to wear them.

When the waist is left in this way, and stitched through close to the edge, it is called a square waist, and is only suitable for riding and other strong boots. The thickness is taken down—not the whole way across, but only at either side —and then off the flesh side. This is the general rule. The sole is placed flat upon a board, grain side down, and a skiver taken off, as from D to D, and then another (by turning the sole the reverse way round) from E to E, leaving the skivers a little thicker at F and F. The dotted line in Fig. 1 shows the shape of the soles when bought in pairs, and also how the sole can be fitted to the boot so that, if it be a narrow toe, the piece G is not wasted. Two of these odd pieces will half heel a pair of boots, or spliced together, will make one top-piece. Therefore, it is well to mark the sole round to the boot, and cut this piece off before putting the sole on. The dark-shaded pieces, F and F, will not, when placed upon the boot, be on top, as here shown, but underneath, next to the welt.

When this is done; and the work has been hammered, so as to make the bottom quite smooth and level, it can be taken off the knees; and a piece of blunt bone or hard wood run right round between the upper and the welt. This will make the welt level, and cause it to set flat against sole is put on, the boot will be a good guide of what the sole should be, which also in its turn has now to be rounded up.

METHOD OF ROUNDING THE SOLE

To this part of the work great care and attention must be paid; since it is this "shaping up" which makes the difference between a well-finished and badly-finished boot.

The boot should be held upon its side on the knees firmly with the left hand. The knife must be very sharp, and held in the right hand. The point should lay on the first finger with the thumb on the top of the blade with the rest and the handle held firmly in the hand. The point should only cover the side of the finger to just the substance of the sole, and not as A, otherwise, the upper of the boot will be cut as shown. The finger is kept next to the sole as at point B, and forms a guard to the knife. The piece (C) taken off need not be one cut, it can be pared in very small pieces so as not to go in too far, and spoil the shape the boot is to be.

This is continued all round, only at C and D the cut must not be close, as the leather here will be wanted to make the seat with and to cover the stitches.

When towards the toe, you will not need to keep the knife cramped up in the hand, as the upper here does not overhang the sole so much, and more liberty may be given to the knife, using the centre more.

The welt and sole should be pared closer at E than at F; but starting very close at G, it must become gradually wider until reaching F, and similarly narrower until reaching B. Then the ends of the waist, C and D, should match, but there must be no stint.

In rounding-up, great care is necessary to make and keep the edge quite even and square. This is the only chance now left to give the fore part of the boot shape and form, and this should be done consistently with the shape of the heel which is to be fitted.

THE WAY THE SOLE IS CHANNELLED

This is by holding the boot firm between the knees with the left hand. The knife (which must be very sharp at the point) should not be wide, and should be held in the right hand, as we hold a pen, only a little more upright. The third and little finger should be left loose. The tip of the second finger is placed on top of the sole on the extreme edge. The knife is then dug into the leather at A, and the third and little fingers that were left loose are now used against the edge of the sole and welt to form a guard, and to steady the movement of the hand while the knife is being passed round the sole.

It will be seen by the dotted line in this figure that the channel has to be cut very near the edge quite round the fore-part, as from B to C, whereas it is wider from A to B and C to D in the waist. This line can be marked off first with a pair of compasses; allowing it to be 1/16 in. from the edge in the fore part and about ¼ in. in the waist; or another very good way of doing the fore part is by filling off the sharp edge (where we found the finger should rest), so that the edge of the grain may form a line.

We have seen how to hold the knife, and now its exact position should form an angle of 50° with the flat of the welt. The point of the knife should pass through the grain of the leather and into the fibrous portion sufficiently that the thread may be well embedded into it. This will be nearly half-way through the leather. It is the substance of the sole that decides the thickness of thread which lies in this channel. The thread, lying in the firm part of the leather in this way, leaves the grain free to form a covering for the stitch when the channel is laid down.

Care must be taken with the waist, as the leather has been thinned down, and if the knife should go more than half-way through, it would not hold the stitch and so that entire sole would be spoiled.

The channel can be opened with any blunt instrument, but the prick-stitch is best. Put the point in at B and open it

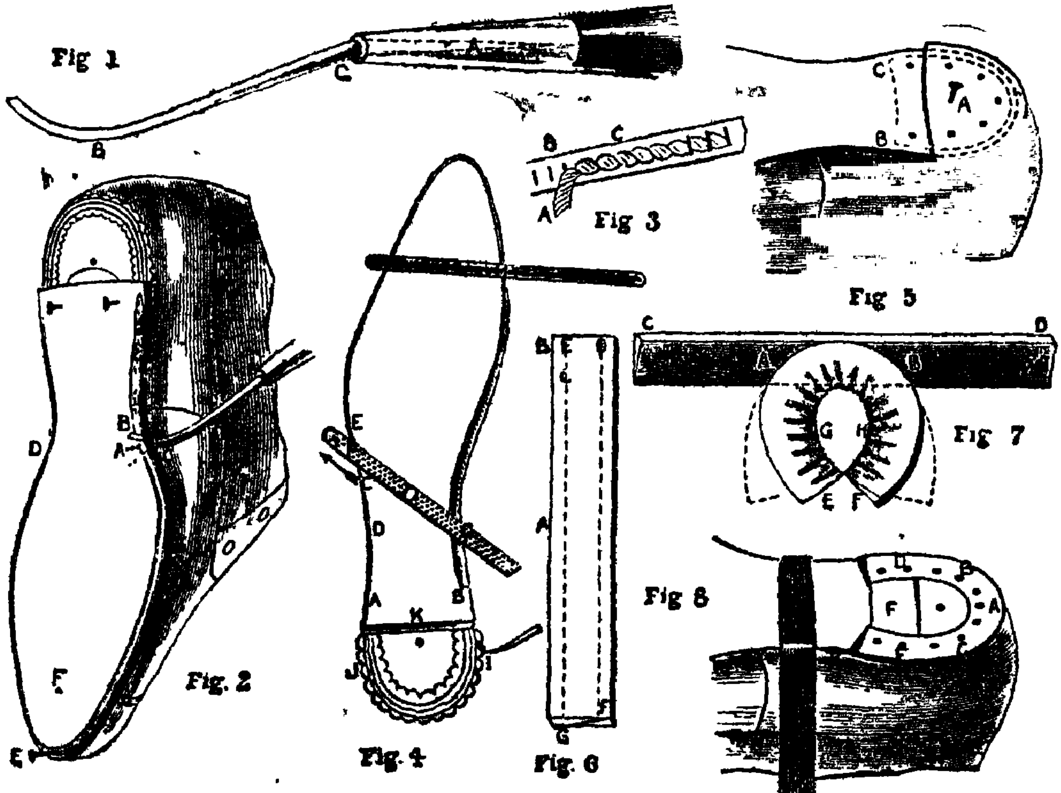
up the whole way round, as shown at A, until reaching C. In doing so, don't disturb the edge, but only the grain on top, throwing it quite back. This will allow the stitching-awl to pass through without cutting. If cut, it would not only make the channel harder to lay down, but also cause an unsightly appearance in the finishing. The bone can now be rubbed round the welt, and it is ready for stitching.

The stitching-thread is our next consideration. This is made in a similar way to the sewing-thread, only it is not made so stout. From five to nine strands are about what are necessary for ordinary work, but whatever be the work, the thread need not be thick, as the stitches are put very close together, and so tend to make a solid result without substance thread. The bristles will need to be a very nice pair—thin, with the transparent part long and round. They are not bent at the end, as the sewing-thread bristles are, but kept quite straight. They can be plaited on, as already shown and described. These threads can be wetted and twisted, and when dry, slightly waxed.

In a great many boots and shoes the stitches on the welt side are shown up yellow. If this result is desired, yellow flax is used to make the thread, and white wax or beeswax employed to wax it. If the ordinary brown wax is used, it must be waxed very sparingly indeed.

METHODS OF ATTACHMENT

Previous to commencing to stitch, run the fudge wheel round the welt. This will make an impression upon it somewhat like a stitch, then while stitching—if the awl be carefully put into each mark of the wheel—you will be able to set a nice, regular stitch.



18. Attachment & Stitching.

In making a boot for your own feet, you need not necessarily stitch the waist, or even the fore-part. It is, however, better to do so, since it makes the work so much more solid. Anyway should you wish to sew them, either for quickness or because you find at first any difficulty in using the stitching awl, you will find the seam will be made much stronger by using a small sewing awl, the side of which you have rubbed off a little on the emery stick.

Stitching is the stronger, because you can get the stitches closer together than in sewing, and, owing to the shape of the awl and the way it is used, a much smaller hole is made.

Before putting the awl in for the first time, place the strap over the left knee and waist of the boot. The boot should lay on the lap while the legs, or knees are held quite firmly together; the toe must be towards you, with the upper to the right and the sole to the left, when, with the thumb-nail of the left hand, the channel can be opened for about 2 in. This is to prevent the awl from cutting or notching the thin piece of grain which was cut up to form this channel. This, if cut about, would become very unsightly when laid down and finished.

It will be seen that the stitching awl is put into a similar handle to the sewing awl, only it is a little smaller. It is an instrument made like the sewing awl, but the point is flat the reverse way, and more square, in fact, it is often called a square awl. It is constructed so that when it is in the handle, as seen at A, the point shall have a certain drop or pitch, as at B to C. This makes it handy to get into awkward places, and, by pressure on the handle, a power is secured which it would otherwise be hard to obtain. The action of this awl is peculiar. It must not be wriggled, as the sewing awl is, but passed right through by one rapid and almost straight jerk, the boot being held exceedingly firm, or the awl will break.

Now, assuming you have stitched or sewn the waist, let us see how to stitch the forepart, this being the point where you set the fudge on the welt. The left thumb is pressed against A, just beyond where the awl is coming out, as shown by B. The awl is laid on the upper, as seen at B and C, with the point against the flat of the welt. It must then be pushed through by one sharp push, just dropping the elbow while doing so, sending the point through to the other side of A, and seeing that it comes out quite in the pit of the channel. Then it must be pulled out just as quickly, and in the same way, but this time raising the elbow while doing so.

The way the stitch is set depends, to some extent, upon whether the work is to be "pricked up," "fudged", or left plain, which is called a "blind-welt", or the stitch sunk in order that the welt may be fudged to imitate stitching. For the two former, the stitch will have to be set up boldly by over-casting the stitch, and by letting the end of the thread in the right hand pass under the stitch during the whole time it is being set, as at A, until it is finally pulled to the same tension as the other stitches.

The three perpendicular lines at B show the mark of the fudge wheel, and where the awl is to be put in each time. The part at C is left plain to show how the stitch is each time thrown the same way.

If the stitch is to be left plain, the stitch and thread can have the reverse action, and so much care need not be taken with it. However always try your hand at the stitch shown, since, as it wants learning this is the best place

to get the practice. If you require to sink the stitch in order to fudge it, take the sewing awl and lay it on the upper as though you were going to sew. With the point just against the welt, draw it the whole way round the welt from C to D letting it cut a channel in the welt just the depth of the grain, and precisely in the same place as where the stitches are to be set.

You can now go on with the stitching, opening the channel with the left thumb-nail at about every inch or so, at the same time not forgetting to put a little wax on the thread on the left side. This process you continue the whole way round, pulling the nail at E out when you come to it. It will be seen that it is placed in the channel to prevent a mark or hole at F, where the tack is generally put, and a peg, or piece of leather, is afterwards to fill up.

THE WAY THE CHANNEL IS LAID DOWN

After the boot or shoe is stitched, the stitches that lay in the channel must be rubbed down the whole way round with a piece of bone or polished wood, and then a little paste is applied here and there and rubbed in, so that there is a thin, uniform coat all round inside the channel. This is usually done by placing a piece of soft rag over the right thumb and putting the nail in the channel and rubbing it up and down the channel from one side to the other. The shoe is held between the knees, heel towards the operator, and the channel is highly laid down by passing the smooth side of an old file over it from A to D (Fig. 4) holding the instrument one end in each hand, and taking strokes from A to C and D to E, and so on. Give the file an outward direction by starting from F, on file, and finishing at G. This will throw the narrow margin of grain made in the cutting of the channel—over the edge as a burr. This is thrown back again by the action of the back of the knife on the edge of the sole, as was done with the file on the top. Then the boot is turned round, and the knife is held in the right hand and the boot in the left, the blade of the knife being flat on the sole. In this position it is passed round to cut off this burr level with the top of the sole. The sole is then slightly damped entirely over, and rubbed down with a long-stick—a piece of round boxwood about a foot long, made very smooth by rubbing with fine sand paper. The sole is worked down by well rubbing first the seam all round as at H, and the centre afterwards. It must be passed over the leather briskly, but not so much as to generate heat and so injure the grain. For this process the boot has to be held firmly between the knees, using the long stick, one end in each hand, as the file. Each end must be at right angles with the channel, and the rubbing done with the centre of it, as at H. When this is accomplished, and the bottom is smooth, the stitches on the welt can be very lightly rubbed down with the bone, and the sole also hammered all over until it is perfectly even. For the waist a round-headed hammer is necessary, this part being nicely hammered.

HOW TO FIX THE SOLE-PIECE

The point of the sewing awl is dipped into a piece of soap so that the wax of the thread will not stick to it. It is then passed under the stitch of the rest as at L. It must not be put through very far, only sufficiently to make the stitches, that were tight before, just lay a little way from the upper, as at I.J. The edge of the sole, at the end, K, is filed a little to throw the grain up and make it smooth, and the piece of leather that is to make the sole-piece must be cut straight at one side, and filed in a way shown at K

These two ends are pasted and put together, and a nail is placed as at A (Fig. 5), with about five pegs driven in, and two in the sole, as indicated by the dots on top. The piece then wants paring up at the dotted line to the shape required, leaving plenty of stuff all round to cover stitch. It should overhang the stitches about a quarter of an inch, not more. A little angular piece must now be taken off round to the second or inside dotted line, and for about a third or bare half of the substance of the leather. The nail is drawn out, and the tops of the pegs taken off, at the same time cutting away the grain of the leather quite round thew, in fact, from the whole of the top, from B to C, being careful to take most away where the pegs are fixed. These should be half an inch from the edge all round, and when the cutting away has been done it can be rasped to make it rough, though fairly level.

THE WAY TO MAKE THE SPLIT-LIFT

The split-lifts are made from a piece of butt leather, generally first-cut, as, while it requires to be tight, it must at the same time be supple. The leather should be about 7 in. long, and say 1 in. wide. Such, with splitting down the centre while quite wet, makes a pair. The splitting is done as follows:—

Place the leather on a board, grain side up, and while the board is on the knees, put the left hand upon the board, letting the thumb rest at A and the little finger at B (Fig. 6). With the first, second, and third fingers press very hard upon the leather (to keep it firm on the board), as at point C. The knife is then held in a slanting position, so that when it is put in at D. on top, it will come out at E on the other side. In this way the knife is drawn along the dotted line, D, until reaching F, bearing in mind that the point must come out on the other side along the dotted line, C to A. Then you secure two pieces of leather, as A B (Fig. 7), which should be quite wedge-shaped, as shown. If you have not succeeded in this while splitting, you must trim them up afterwards. One is then laid on the lap-iron with the thin edge towards the worker, as shown in the diagram. The left thumb is placed upon A, and the right upon B, with thumb-nails towards you, the hands back to back, and the two fore-fingers against C and D. In this way the thumbs can be pressed very hard, and the two ends brought round to E and F. This will make the thin edge pucker up in the centre, as B and H, but these are hammered down flat by tapping down round the centre while you hold the two ends between the thumb and finger of the left hand. Thus one split-lift is made, and the process must be repeated for the other.

Although the split-lifts must be cut (or split) while wet, it is best to let them dry a little prior to blocking them on the lap-iron. When this is done, you will find that in drying they open a little at the ends, as shown by the dotted lines. For this reason the ends are held together in order that they may dry the proper shape.

THEIR PROPER PLACE IN THE HEEL

The heel, as you left it in Fig. 5, was rasped off and made rough. This is done so as to receive a thin coat of paste all round the same width as the split-lift, which is rasped on one side and treated similarly. It is then put on the sole, as shown in Fig. B, the boot being held firmly on the knees by the strap passing over the waist and between the knees, while the heel end is on the right and the toe on the left knee.

The edge of the split-lift is fixed just flush with the edge of the centre of the seat-piece at A, and a peg driven in.

Another is put in at B, and one at C, then one at D, and other at E. This will keep it in its place while another is put in between each of these, but they must all be placed as far away from the edge, or as near the centre, as the thickness of the split-lift will admit.

It is then nicely pared round. The outside corner (if a gent's or lady's square heel boot) should be left square, while towards the back and inside corner it can slant in somewhat. Then the tops of the pegs may be cut off and the top rasped as was the seat; also remove the two ends just over the mark, F. In doing so slip a piece of zinc under the end previous to cutting, so that you do not cut the grain of the sole in the process.

BUILDING OF HEELS

In building of the heels it is advisable to refer to the methods of attaching them, since the latter governs the former. Heels may be attached from the inside, the nails being driven through the insole into the heel, or they may be attached *from the outside, the nails passing through* the full height of the heel and forming a burr on the insole. When heels are attached from the inside they must be made solid during the building and compressing; the nails which are used in building must be burred at the point to prevent the lifts springing; but the nails used for attaching the heel to the shoe need only penetrate the heel far enough for security. The heels in this case may also have the top-piece fixed before attaching the heels to the shoes; they may also be breasted and scoured. It is a very great advantage when the last two operations can be performed before attaching the heels, since there would be no fear of marking the shank of the sole with a long seat lift a mark sometimes difficult to remove. More skill is required to breast heels after they are attached. Since there is danger of cutting through the sole, and should the shank be more arched than usual it may also be necessary to finish cutting the bottom lift with the hand knife. It is indisputable that the front of the heel could more quickly be scoured against a cylinder (such as the harder of the two bottom-scouring rollers) than against the cone-shaped, heel-scouring device, the method therefore economizes labour, skill and abrasive. When heels are attached from the outer side, they are not often subjected to so much compression previous to attaching, the top-piece must be nailed on.

FINISHING

In carrying out the operations it is advisable that lasts should be inserted to enable the operator to grip the shoe firmly without incurring the risk of damaging its shape. The operations may be carried out in two stages, namely:—

(1) Those which increase the efficiency of the shoe.

(2) Those which only improve its appearance.

It has been seen that it is a disadvantage for leather to absorb water quickly, and that operations which tend to make the leather more impervious to the penetration of water must enhance its utility; nothing however beyond the rolling can be done to that part of the surface of the leather which in wear is subject to abrasive friction, because the part treated would be quickly worn off: but the edges of the soles, which absorb water so rapidly because of the coarseness of the fibre, can be treated to retard the percolation of the water.

SCOURING

This is the first operation for finishing the shoe. It is carried out with some sort of abrasive materials or machine.

The scouring may be efficiently performed by holding the heel against a revolving broad-faced wheel covered with thick felt over which is temporarily strained an abrasive.

After this the edges and heels are wet with a solution of iron sulphate; this dries and shrinks the face of the heel. When the heels are built of loose material they are sometimes given a coating of filler before being finally smoothed up; excellent results may be obtained by so doing, because the filler may contain more shellac or dextrine than could be used in the ink without it showing grey.

TRIMMING

Next, the edges of the shoe are trimmed to improve its appearance. The operation of edge-trimming should do more than prepare the edge so that it could be compressed and burnished; it should also correct some defects in the irregularity of the width of the welt, which may be caused by one upper being stouter than another, or possibly one sole may have been placed further over the toe than another; sometimes the soles do not correctly fit the last, or in attaching the sole it may have slipped to one side; the operator should endeavour to correct these defects, but should never reduce the sole more than is necessary.

The successful trimming of edges probably depends as much upon the suitability of the condition of the work as upon the keenness of the cutter. When a knife is used by hand, the action is on the principle of a very fine saw, but when an edge is trimmed by machine the principle is that of a blow with a keen-edged tool. Since the trimmed edge will be coarse in proportion to the comparative hardness and coarseness of the leather it is usual to counteract its natural hardness by obtaining an artificial mellowness with wetting.

With the object of further improving the appearance of the edge and helping it to retain this appearance in wear the trimmed edge must be made more solid and more waterproof by compressing so that the fibres and the substance which fills the spaces between them are forced into a smaller compass, tool employed being the setting iron. This is moved backward and forward upon the edge exerting considerable pressure. In addition to the compression which can in this way be obtained it will be observed that there are two flanges or lips—one to fit on either side of the edge of the sole; these are important for the face of the edge rather than allow itself to be compressed increases in thickness; these guards limit its increase in width, and so it yields to compression in this direction and is finally obliged to yield also at the face. This compression in the double direction to be satisfactory requires not only that the bed of the iron agree with the face of the edge, but also that the angle of the welt lip both on the cutter and on the setting iron be the same, and likewise the angle of the sole guard on both cutter and iron; more attention to these details would considerably lessen the edge-setter's work.

STITCH CLEANING

Another process is the stitch cleaning. This is levelling of the welt and removing the surplus wax from the stitches.

The tool used for cleaning is usually a bone with a number of corrugations on the face.

HEEL-CORNER SHAPING

At each side of the waist, near the heel, there is always a portion of the edge which cannot be properly paved without danger to the heel. This portion has to be shaped and the corners must be squared up before applying the inks.

INKING

Inking performs three functions, namely colouring, filling and assisting the polish. The ink must be put on evenly and without bubbles, the brush should be moved in one direction, and should also be of the best quality. The introduction of waxed inks has made the application more important. In inking edges there is no necessity to paint the upper at the same time, it involves labour to remove it.

EDGE SETTING

The object of setting is to compress and burnish the edge of the sole. At the same time, it binds the sole and middle or welt together and gives a well-defined shape to the bottom. Machines used for the purpose are rotary and vibratory setters.

WAXING AND BURNISHING

After trimming heels and edges are polished with heel balls made of carnauba wax. This may be applied by revolving pad, the heat being supplied by the friction of the pad on the heel in addition to device from melting and applying the wax.

In edge-setting it is an advantage to use a little wax in the form of a fake for filling the edge, since it is more readily applied, does not require so much heat to iron it in, and the excess is more easily removed.

FINISHING THE BOTTOM

The bottom of the shoe may be finished in several styles; probably the most popular method is with paint; the preparation when used is of a creamy consistency, this is "floated" over the bottom in such a way that after the absorption or evaporationtion of the liquid part there will remain a thin opaque film, even in colour. If after the paint is quite dry it is left without anything further being done to it, then it would not be a suitable finish for shoes, since it would sc quickly soil; to correct this and further to improve its appearance, it may b finished off in either of the followin ways:—

(a) Dusted over with French chal and then polished with a so cloth.

(b) Suitable fake applied to th painted surface, it would the be polished with a soft clot after the absorption of the sol vent.

(c) After faking, the surface ma be boned.

(d) An improvement on the foregoing is to apply the wax to power brush, since there is al liability of burning, beside which a smaller quantity or wa is used, and it is more evenl applied.

BEADING

The object of beading is to set up th channel and give a good appearance to the edge of the sole surface. This is attained by melting a small quantity of wax on the edge, afterwards setting up wit the lip of an iron, similar in shape to th single lipped setting iron. The machine method consists of a revolving top-iron which melts the wax and sets up at the same time.

POLISHING

This is the final operation in the finishing department. Soft cloth revolving pads are used to remove any wax. etc., and soft powder brushes for polishing. The lasts are now withdrawn and the goods passed forward into the next department for packing into boxes.

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Pharmaceutical Recipes

SPIRIT OF SAL VOLATILE (B.P.)

Ammonium bicarbonate	25	grms.
Strong solution of ammonia	60	c. c.
Oil of lemon	5	,,
Oil of nutmeg	3	,,
Alcohol (90 p.c.)	750	,,
Distilled water, sufficient to produce	1000	,,

Place the oil of lemon, oil of nutmeg and and alcohol with 375 c. c. of distilled water in a still; distil 875 c.c.; then distil and separatly collect an additional 55 c.c. Place the latter, together with the ammonium bicarbonate and the strong solution of ammonia, in a bottle of rather more than 120 c.c. capacity; securely close the bottle, and gently warm it in a water-bath to 60°C. shaking from time to time until all the salt has dissolved. Filter the resulting solution, when cold, through cotton wool, and gradually mix the filtrate with the portion first distilled. Add sufficient distilled water to produce the required volume.

ZINC OINTMENT

To prepare zinc ointment, it is indispensable to prepare simple ointment first in the manner as shown below:—

Wool fat	50	grms.
Hard paraffin	100	,,
White soft paraffin	850	,,

Melt together; stir until soil. Now take the following.—

Zinc oxide finely sifted	150	grms.
Simple ointment	850	,,

Triturate the zinc oxide with a portion of the simple ointment until smooth; gradually add the remainder, and mix thoroughly.

INJECTION OF QUININE DIHYDRO-CHLORIDE

Injection of quinine dihydrochloride is a sterile solution of quinine dihydrochloride in water for injection. The content of quinine dihydrochloride is not less than 92.0 per cent. and not more than 105 per cent. of the content of quinine dihydrochloride stated on the label. The solution is sterilised by heat in an autoclave or by filtration.

When injection of quinine dihydrochloride is prescribed, no strength being mentioned, a solution containing 0.3 grm. in 5 c. c. or 5 grains in 75 mins. shall be dispensed. A solution of this strength must be diluted with at least 10 times its volume of injection of sodium chloride before administration and injected slowly.

DILUTED NITRO-HYDROCHLORIC ACID

Nitric acid	12	oz.
Hydrochloric acid	16	,,
Distilled water	100	,,

Mix the nitric and hydrochloric acid with the distilled water, and keep the mixture in a glass-stoppered bottle for 14 days before use.

SYRUP OF LEMON (B.P.)

Fresh lemon peel, in thin slices	60	grms.
Alcohol (60 per cent.) a sufficient quantity.		
Citric acid, in powder	24	grms.
Syrup, sufficient to produce	1000	c. c.

Macerate the fresh lemon peel in 70 c.c. of alcohol (60 p c.) for 7 days; press, filter, and add to the filtrate sufficient alcohol to produce 100 c.c. Dissolve the citric acid in the liquid, and mix with a sufficient quantity of syrup to produce the required volume.

SYRUP OF CALCIUM LACTOPHOSPHATE

Calcium lactate	7.5	grams
Phosphoric acid, concentrated	7.5	,,
Orange flower water	2.5	,,
Refined sugar	70.0	,,
Distilled water to produce	100	,,

Mix the calcium lactate with 40 grams. of distilled water, and the concentrated phosphoric acid and stir until solution is complete, add the orange flower water, dissolve the sugar in the cold mixture, add sufficient distilled water to produce the required volume, and filter.

ADHESIVE PLASTER.

Rosin	10	grams.
Lead plaster	85	,,
Hard soap	5	,,

Melt the rosin, lead plaster and hard soap separately, at a low temperature, and mix them.

The lead plaster as stated above may be prepared thus:—

Lead oxide	40	grams.
Olive oil	80	,,
Distilled water	40	or q.s.

Boil gently together in a steam bath, stirring constantly until combination has been effected. when cool remove the plaster-like mass produced; knead it thoroughly with hot water and allow it to dry.

Recipes for Small Manufactur

ADHESIVE TAPES

Adhesive tapes are generally prepared with cotton fabric, or sometimes rayon. The fabric should be smooth, without knots, and free of heavy metal salts. The fabric is coated with the following composition:—

Rubber	30	parts.
Barium sulphate	40	"
Rosin oil	15	"
Rosin or tar	15	"

The mixture is homogenised on rolls, then dissolve in a mixing machine.

COLOURLESS FRENCH POLISH

White shellac	4	oz.
Sandarac	1	"
Sand	4	"
Methylated spirit	20	"

Powder the resins, mix with the sand, and dissolve in the spirit. Decant the clear portion, and filter the remainder.

LIQUID GLUE

Gelatin	1	lb.
Water	8	oz.

Allow to stand together in a 4 lbs. gallipot until the gelatin is soft; then put the pot in a saucepan of water, and heat until the glue dissolves. Next add

Nitric acid	7	dr.

Stir until effervescence ceases, set aside for 12 hours, and decant.

NON-POISONOUS FLY PAPERS

Quassia	16	oz.
Colocynth	2	"
Long pepper	4	"
Water	1	gallon.

Boil until the decoction is reduced to 4 pints; strain and dissolve in the clear liquid 4 oz. of sugar.

Dip the absorbent paper in the solution and dry. For use, moisten the paper with water or place the paper in a dish containing water.

DRY CLEANERS' BENZINE SOAP

Oleic acid	370	grms.
Stearic acid	80	"
Potassium carbonate	80	"
Water	70	"
Benzine	395	"
Solution of ammonia (28 per cent.)	5	"

Melt the stearic acid and incorporate with it the warmed oleic acid. To this mixture add the warm benzine and mix thoroughly. Dissolve the potassium carbonate in the water and briskly stir this solution into the benzine mixture. Finally add the solution of ammonia and heat into a homogeneous paste.

STENCIL INK

Prussian blue	2	p
Lamp black	1	p
Gum arabic	3	p

Glycerin—a sufficient quantity.

Mix the powders and make into a paste with glycerin.

DRY CLEANING FLUID

Glycol oleate	2	fl
Carbon tetrachloride	60	"
Naphtha	20	"
Benzin	18	

Mix. This is an excellent cleaner not injure the finest fabrics.

FABRIC MARKING INK

Copper sulphate	20	gr
Dextrin	10	
Aniline chloride	30	
Glycerin	6	
Distilled water	100	c

Mix in the order given.

WHITE SHOE DRESSING

Lithopone	19	o
Titanium dioxide	1	"
Bleached shellac	3	"
Ammonia liquor	½	fl
Water	25	"
Rectified spirit	25	"
Glycerin	1	o

Dissolve the shellac in the sp ammonia. Then mix the water and Then to this mixture incorporate the l and titanium dioxide. Keep in stoppere and shake before using.

PAINT BRUSH CLEANER

1. Kerosene 2
   Oleic acid 1
   Mix.
2. Strong liquid ammonia ½
   Denatured alchol ½
   Mix.

Slowly stir 2 into 1 until a smooth results. To clean brushes, pour into a stand the brushes in it overnight. morning wash out with warm water.

In the Field of Invention

VITAMIN B_{12} BY FERMENTATION

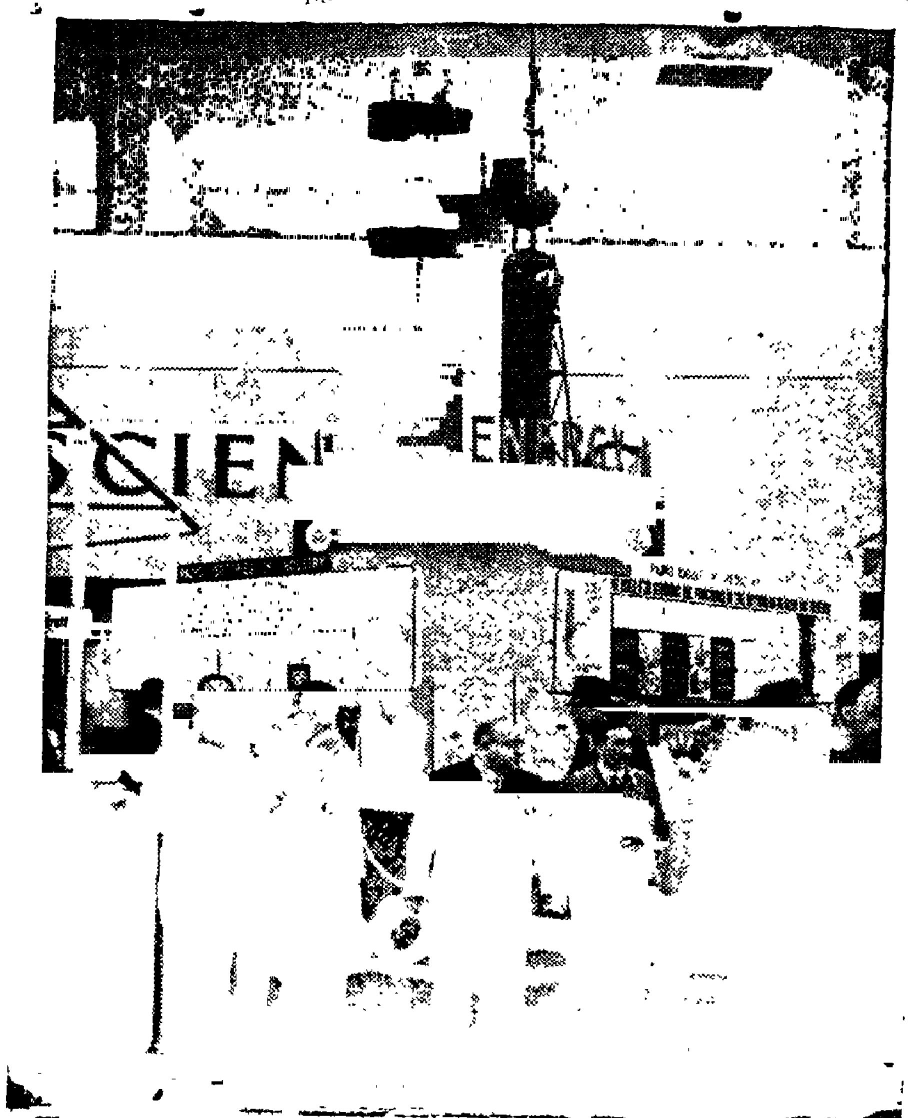
The isolation of Vitamin B_{12}, the new vitamin used in the treatment of pernicious anaemia, has been reported from the laboratories of Merck & Co., Rahway, N.J. Red crystals of the vitamin were obtained in the fermenting media using the mould Streptomyces griseus. This discovery may soon make the production of the vitamin in commercial quantites passible (Sci. New Letter, Dec. 11, 1943)

"AQUALIZED" GUMS

A new process for treating vegetable gums is claimed to make them capable of being dissolved in a matter of minutes compared with hours needed for conventionally prepared gums. Boiling of these "aqualized" gums is unnecessary, so is alkali treatment. They require no filtering and there is no loss of undissolved gum.

—MANUFACTURING CHEMIST.

RADIO-ISOTOPES



The above picture shows the production and uses of Radio-Isotopes in industry and medicine. It was taken at the Atomic Energy Research Establishment at Olympia, London. The original Cockcroft Walton Generator is seen on the top of the diagram.

Formulas, Processes & Answers

RUBBER LATEX THREAD.

The method for making elastic thread from latex involves forcing a latex composition continuously through a tubular orifice into a coagulating bath. The latex is fallen at once and the thread thus formed is passed immediately into a dehydrating bath. Acetic acid solution may be used for co agulation and glycerin for the dehydration In some cases a combination co-agulating and dehydrating bath is used, made up to contain 200 grams of sodium chloride, 300 grams of ammonium acetate and 60 grams of acetic acid per litre of aqueous solution. A suitable latex composition for thread is as follows:—

Rubber latex 60 p. c.	100	lbs.
Zinc oxide	3	,,
Dispernal (Antox)	2	,,
Tetrone A	3	,,
Dispersed Heliozone	2	,,

Cure 90 minutes at 212°F.

THINNERS FOR MOTOR ENAMELS

2742 O.P.L., Delhi — Wants to have a formula of thinners for motor enamels and also sewing machine oil.

Glossy Thinners	50	per cent.
Methylated spirit	20	,, ,,
Toluol	20	,, ,,
Xylol	10	,, ,,

SEWING MACHINE OIL

Rape oil	10	parts.
Alcohol 90%	5	,,

Mix the oil with alcohol and heat the mixture on a water bath until the alcohol begins to boil, the whole being kept stirred. When boilling of the spirit sets in put out the fire and pour the liquid into a large flask of clear glass and expose to sun light until thoroughly bleached.

SOLUTION OF D. D. T.

2746 B.N.B., Chauthan—Wishes to know the process of preparing D.D.T. solution

To prepare D.D.T. solution take D.D.T. 10 parts and put it in carbontetrachloride 90 parts. Shake for a few minutes and then keep aside for a few days.

SOLDERING STAINLESS STEEL

2751 M.S., Bombay—Wants to have a process of soldering stainless steel.

All of the USS Stainless Steel grades can be soldered by customary procedures. Soft soldered joints, when not strengthened by double seaming, spot welding, or riveting should not be depended upon to resist mechanical loads or shocks and should serve only as closures to liquids and gases. Soldering is suggested only where corrosive conditions are relatively mild, such as in joints exposed to the atmosphere and water.

The ordinary lead tin solder composed of 50% of each metal is quite satisfactory. The operation, however, may be performed somewhat faster with a higher tin grade known commercially as 60-40, because of its lower melting point.

The adherence of the solder depends very largely on the character of the surface of the metal to be welded. Rough surfaces, such as No. 1 Finish, provide better adhesion than smooth surfaces such as are found in No. 2B and polished finishes In soldering smooth surfaces, it is customary to roughen the areas to be covered, either with a file, coarse abrasive paper, or by etching. For this, a water solution of approximately 50 parts. of ferric-chloride in 100 parts of concentrated hydrochloric (muriatic acid) is often used. The solution should be applied only to the areas to be soldered and not be allowed to run on to adjacent areas. It should be allowed to stand for five to fifteen minutes before soldering.

Stainless steel sheets may be soldered with or without tinning, although tinning the edges is preferable.

There are several commercial grades of stainless steel soldering flux on the market which perform nicely. Also, the usual acid flux consisting of commercial hydrochloric acid killed with zinc, with or without an addition of 10% commercial acetic acid, is satifactory. A solution of approximately 10% phosphoric acid is preferred by some fabricators, since it is a weaker acid than hydrochloric acid and claims are made that it provides better joints. The flux can best be applied with a brush and care again should be taken not to coat excessive areas.

It is preferable to use large irons or "coppers" in soldering stainless steel, because of their greater heat capacity. Preheating the edges slightly with a soft torch is often helppul in soldering heavy gauges.

After soldering is completed it is imperative that the article be carefully washed immediately and rinsed to remove all traces of the soldering flux. It is advisable to wash the whole piece thoroughly—not merely the soldered joint, since it has been found that splattering and fumes from the flux cause a wetting of the metal with acid at points far removed from the joint itself. The soldering acid will cause pitting and corrosion of the metal unless promptly removed. The addition of 5 to 10% common washing soda to the wash water aids by neutralizing the soldering acid.

JELLY MAKING

2783 B.D.G., Kanpur—Desires to know the process of making jelly.

Fruit jellies differ from jams simply in keeping the shape of a mould after they are removed from it, and forming a coherent trembling mass like a gelatin jelly.

The manufacture consists in breaking up the fruit. The pulp is then packed in linen bags, which are subjected to the power of a screw press, so as to express out the juice as much as possible. The liquid thus pressed out is mixed with sufficient quantity of sugar. Some juice need so much sugar to thicken them that the taste of the fruit is almost entirely concealed. In this case a small quantity of raspberry juice or pectin is added so as to avoid spoiling the taste with too much sugar. Ten per cent. of raspberries are enough even for the thinnest juice.

The slow heating, to give the pectose time to act, is essential, and is best done on a water bath. The heating is continued until a few drops, allowed to drop from a spatula on to a cold stone gelatinise quickly. If the mass does not gelatinise, more sugar must be added, stirring it in a little at a time.

All temptation to hurry matters by using more heat must be absolutely resisted, for fear of charring the mass. The least suspicion of this ruins the whole beyond repair, by forming caramel.

The jelly thus obtained is poured hot either into moulds or into shallow pans. In the latter case it is further cut up with a wire after it has set. The pans or moulds should be warmed before the jelly is poured in, so that the jelly may set slowly.

Fruit jellies are very hygroscopic, and hence soon absorb enough water from the air to become sticky.

CAMPHOR TABLETS

2768 V.T.C., Thiruvatter—Wants to have a formula of making camphor tablets.

To prepare camphor cakes or tablets, moisten the camphor crystals with alcohol by spraying; then put in moulds and compress. By this means the camphor will form into blocks. On exposure to air the alcohol will volatilise leaving aside camphor in the form of blocks.

GREEN MARKING INK

2993 B.G., Lucknow — Wants to have a recipe of green marking ink.

Silver nitrate	11	parts.
Ammonia solution	22	"
Sodium carbonate	22	"
Water	12	"
Gum	50	parts.
Sap green	2	"

Dissolve the silver nitrate and the ammonia and the sodium cabonate in the water separately. Boil the latter and pour the silver solution into it. Then add the gum and colour with the sap green.

PURPLE RUBBER STAMP INK

2804 P.T.J., Cochin—Wishes to have formulas of purple rubber stamp ink, etc.

Methyl violet	1	part.
Water	7	parts.
Glycerin	2	"

Dissolve the methyl violet in hot water and mix the glycerin.

INDELIBLE MARKING INK

Phosphate of manganese	1	oz.
Hydrochloric acid	2	"
Anthracene	4	dr.
Chromate of potassium	2	"
Gum arabic		sufficient.

DUPLICATOR

Glue	8.5	parts.
Sorbitol (Commercial)	31.0	"
Glycerin	48.4	"
Water	12.1	"
Formaldehyde	.2	"

Soak the glue in the water and glycerine for a few hours. Then warm and mix the sorbitol and lastly formaldehyde. Pour in tray.

METHYLENE BLUE

2776 V.N.S., Erode—Wishes to have a formula of preparing methylene blue.

Dimethylaniline	2g	grams.
Hydrochloric acid, conc.	65	"
Sodium nitrite	71	"
Zinc dust	20	"
Sodium thiosulphate	50	"
Potassium bichromate	25	"
Sulphuric acid, conc.	53	"
Sodium chromate, neutral	8	"

Dissolve 12 grams of dimethylaniline in a mixture of 40 c.c. of water and 65 grams of concentrated hydrochloric acid, and cool the solution with ice to 12°-15°C. Stir the mixture and slowly run in the sodium nitrite, taking care that the temperature does not rise above 15°C. The compnd thus formed is next reduced by carefully, adding the zinc dust added must be sufficient to neutralise the hydrochloric acid, so that the blue litmus paper is no longer turned red. The solution is now diluted with water to 500 c.c. and a solution of 12 grams of dimethylaniline in the exact quantity of hydrochloric acid necessary to form the hydrochloride addded, and then a solution of 50 gram of sodium thiosulphate in a little water.

Then oxidise the mixture by adding a concentrated solution of 25 grams of potassium bicarbonate and boiling for 2 hours.

Now pour the sulphuric acid being diluted with 100 c.c. of water and boil so as to expel sulphur dioxide formed in the reaction.

Next oxidise the leuco-methylene blue by adding the neutral sodium chromate dissloved in a little water and precipitate the resulting dye by the addition of salt.

Again, filter the base, dissolve it in a little boiling water to which a little hydrochloric acid has been aded and again precipitate by common salt, filter and finally dry on a porous plate.

BROWNING GUN BARRELS

2779 N.N.P., Nugegoda—Wants to know a process of browning gun barrels.

The following recipe for browning is from the United States Ordnance Manual: Spirits of wine, 1½ ounces; chloride of iron, 1½ ounces; corrosive sublimate, 1½ ounces; sweet spirits of nitre, 1½ ounces; blue vitriol, 1 ounce; nitric acid, ¾ ounce. Mix dissolve in 1 quart of warm water and keep in a glass jar. Clean the barrel well with caustic soda to remove grease or oil. Then clean the surface of all stains and marks with emery paper or cloth, so as to produce an even, bright surface for the acid to act upon, and one without finger marks. Stop the bore and vent with wooden plugs. Then apply the mixture to every part with a sponge or rag, and expose to the air for 24 hours, when the loose rust should be rubbed off with a steel scratch brush. Use the mixture and the scratch brush twice, and more if necessary, and finally wash in boiling water, dry quickly, and wipe with linseed oil or varnish with shellac.

WOOD ADHESIVE

Tar, anhydrous	60	parts.
Asphaltum	15	"
Sulphur	25	"
Rosin	2	"

Melt up and mix thoroughly.

TARAL ALTA

2794 M.D.M., Lucknow—Wants to have good recipes of taral alta and bindi.

Rhodamine B. Extra	2	oz.
Brilliant crociene	1	"
Rectified spirit	4	"
Glycerine	1	lb.
Glue	2	oz.
Water	40	"

Soak the glue in a portion of the water for a couple of hours; then warm and mix the remaining water. Raise the temperature of boiling point and add the colours and glycerine. Then set aside to cool. When cold add the spirit and bottle.

BINDI PASTE

Carmine	15	parts.
Gum arabic	2	"
Bronze powder	1	part.

Macerate the first two ingredients with rose water in a stone mortar. Mix the bronze powder into the paste. Put up in a phial.

RINGWORM LOTION

2797 S.H.B., Ahmedabad—Wishes to have formulas of ringworm lotion, hair tonic, etc.

Sodium sulphide	2	dr.
White soap	2½	"
Rectified spirit	2	"
Lime water	7	"

Mix.

HAIR TONIC

Olive oil	8	oz.
Sweet almond oil	8	"
Oil of origanum	1	dr.
Oil of rosemary	1	"
Oil of lavender	1	"

Mix all together. Apply daily over the head with a soft brush.

The above is mild in action and is helpful when hair first begins to fall off.

GULKAND

2826 B.S.R., Udipi—Wants a process of making gulkand.

Gulkand is generally made from the petals of rose in a similar manner as fruits preserved in sugar. It possesses mild laxative properties and is said to be most useful for sore-throat or enlarge tonsils, and also fattening to women and old people.

LEMON GRASS OIL

The essential oil known as "lemon grass", "verbena" or "Indian malissa" is obtained by the distillation from the leaves of Andropogon citratus, a large coarse grass, growing wild on extensive tracts of land in Ceylon; it rarely bears flowers. It is grown especially for its oil in Ceylon and Singapore, on the same estates with citronella, and is commonly met with in gardens in India, Java and the Malaccas.

SCENTED COCONUT OIL

2900 I.C.M., Bhadohi—Desires to have a recipe of preparing scented coconut oil.

Coconut oil	30	seers.
Rose oil	4	fl. oz.
Musk ambrette	1	oz.
Sandal oil	1	fl. oz.
Benzyl benzoate	1	"

Dissolve the musk in the benzyl benzoate and mix the other essential oils by shaking. Then mix with the coconut oil. Shake for 4 minutes; keep aside for a few days to mature. Then bottle for use.

BRILLIANTINE.

3070 M.V.G., Nagpur—Desires to know formulas and processes of preparing brilliantine, nail polish, etc.

White wax	5	parts.
Spermaceti	4	"
Stearic acid	10	"
Paraffin oil	80	"

Melt the waxes and fats on a water bath or over slow fire and heat the oil in another vessel; then mix the two together thoroughly at the same temperature so that the waxes do not crystallise. Add the perfume when the mass has cooled down to 45°C.

For perfume use may be made of 2½ dr. of the following compound for each lb. of the brilliantine:—

Cinnamon oil	1	oz.
Geranium oil	2½	"
Terpineol	2½	"
Linalol	4	"
Bergamot oil	6	"

NAIL POLISH

Celluloid film, cut small	200	gr.
Amyl acetate	2	oz.
Acetone	5	"
Eosine or spirit red	50	gr.

First clean the celluloid film by soaking it in soda solution for a day, then scrape it with a blunt knife. Dry it in the sun. Then cut it into small pieces and weigh out. Put it in the mixture of acetone and amyl acetate in a well stoppered bottle. Then add the colour. Keep aside for a day or two. Then strain and bottle.

Ethyl acetate may be used in place of acetone.

SNOW

Stearic acid	180	parts.
Hard paraffin	20	"
Potassium-carbonate	13	"
Glycerine	50	"
Distilled water	750	"
Bergamot oil	2	"
Lavender oil	1	part.
Ylang-ylang oil	1	"
Vetivert oil	1	part.
Geranium oil	3	parts.

Dissolve potassium carbonate in 250 grms. of water. Then take the remaining quantity of water and pour into it the glycerine. Next take an enamel vessel and put it over waterbath. Then put into it the stearic acid. When it is melted slowly pour into it warm solution of potassium carbonate. Continue stirring and then pour the remaining water, which is also warmed to 70°C. Go on stirring for some time. Then remove to congeal. Then mix the essential oils and keep aside for 3 or 4 days after putting a cover over it. Lastly put in phials.

WHITE LEAD.

3130 H.L.V., Madhupur—Wants to have a process of manufacturing white lead.

White lead is manufactured on a large scale by several processes, the oldest of which yielding the best product is known as the Dutch method. It depends upon the action of acetic acid on metallic lead, in the presence of moist air and carbon dioxide. The lead, cast into rough gratings in order to expose a large surface is placed in earthenware pots. A small quantity of dilute acetic acid is placed in the pots and the gratings of lead, which rest upon the shoulder of the pot, are piled one upon the other. These pots are then placed upon a thick bed of spent tanbark (Cow-dung), upon the floor of a shed and covered with planks. Upon these another layer of tanbark is spread, and a second row of pots similarly charged. In this manner the layers of pots are built up to the roof of the shed, and the whole allowed to remain for about three months. Such a stack will contain many tons of lead, and about 65 gallons of dilute acetic acid to the ton metal. The acid is gradually vaporised by the heat developed by the fermenting tanbark, which results first in the formation of a basic lead acetate.

The basic acetate is then acted upon by the carbon dioxide evolved during the fermentation, with the production of a mixture of normal lead acetate and basic lead carbonate. And the lead acetate, in the presence of air and moisture, reacts upon a further portion of the metal, regenerating the basic acetate, which is once more decomposed by carbon dioxide.

In this cycle of reactions the acetic acid acts as a carrier, a comparatively small quantity being able to convert an indefinite amount of lead into white lead.

Brief Queries and Replies

959 T.J., Palamau—Following is a formula of foam producer: Soap bark (chips) 1 lb; boiling water 10 pt.; alcohol (95 p. c.) 1 pt.; Boil the soap bark in the water for 30 minutes. Allow to cool. Add the alcohol. Pack a small quantity of dry soap bark in a percolator to make a bed and percolate. One-half to 1 ounce of this is used per gallon of syrup.

960 V.C., Gadag—Eucalyptus oil is adulterated with turpentine oil. In order to remove the defect of tablet making machine you should dry the granules thoroughly and lubricate the dies occasionally.

962 K.J.P., Zanzibar—We have no other book on bakery except Home Industries which you have already got. It is advisable for you to consult an expert.

966 L.O.G.M., Ghurhari—For casing and capping machine enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta. Tea seed oil is made by the process of extraction.

967 C.L., Palakol—Add wine yeast when fermentation will take place. Now distilling this you will get alcohol which should be denatured by adding bone oil.

970 V.B., Aijal—For dollar you may write to any exchange bank.

989 D.S., Secunderabad—Wants to be put in touch with the suppliers of red and orange colours suitable for tatooing.

992 S.M.J., Indore—All kinds of dies and moulds may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. Bottles may be had of Allahabad Glass Works, 17, Ezra Street and Essence & Bottle Supply Co. Ltd., 14, Radha Bazar Streeto both of Calcutta. Tin cans may be had of Bengal Tin Box Mfg. Co. Ltd., 1, Jadu Nath Mitter Lane, Calcutta 4. For lace making machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

994 A.B.S., Palghat—An article on cement manufacture appeared in June 1949 issue. Process of manufacturing washing soda and bleaching powder will be found in Chemical Industries of India published from this office price Rs. 3/7/- including postage. You may consult Safety Matches and Their Manufacture published from this office, price Rs. 5/8/- including postage.

997 J.B., Tuticorin—Reply to your letter has already been sent by post.

1001 I.O.L., Dhamangaon—For radio and gramophone enquire of L. C. Saha Ltd., 20D, Lindsay Street and N. B. Sen & Brothers, 11, Esplanade East; both of Calcutta. Pocket typewriter may be had of Calcutta Typewriter Co., 3-1, Mangoe Lane, Calcutta and Globe Typewriter Co., 10, Clive Row, Calcutta.

1004 R.P.O., Mathuvai — Moulding powder and mould for plastic industry may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta and Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

1005 D.M.P.P., Lindula—Process of manufacturing tea tablets and tea extract will appear in Formula Section in due course.

1007 S.A.D.P., Etawa—You may ask any question of industrial or technical nature when replies will be published in due time.

1008 H.N.S., Chakdaha — To sell patent right of your invention advertise in newspaper.

1009 J.T., Allahabad—Process of manufacturing disinfecting fluid appeared in March, 1949, issue of Industry.

1010 R.C.G., Ajmer—Process of manufacturing blue print paper appeared in July, 1948, issue of Industry.

1011 A.C., Travancore—Refer your query to the Director of Disposals, New Delhi. Laundry machine may be had of Jessop & Co., 93, Netaji Subhas Road, Calcutta.

1012 H.L.K., Delhi—Carbon rods and zinc sheets may be had of Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road, Calcutta.

1013 V.S.K., Shahapur—Silks are weighted with soluble substances such as cane sugar, glucose, mangnesium salts, gelatine, etc. One of the most common methods of weighting with tin is by treatment with a solution of stannic chloride followed by treatment with solutions of phosphates and silicates whereby the tin is precipitated in the fabric as insoluble phosphate and silicate of tin.

1017 J.C.I., Chilaw—The process by which vegetable oil is converted to ghee like substance is known as hydrogenation. Process of hydrogenation will be found in Vegetable Oil Industry published from this office, price Rs. 3/7/- including postage.

1022 J.D., Wardha—A formula of scented coconut oil appeared in September, 1948, issue of Industry.

1024 K.L.K., Rajnandgaon—Add a small quantity of gum acacia mucilage to the prepared tobacco. As regards scents you should use musk of as many varieties and as much quantity as you can.

1026 G.S.B., Mewar—For house cleaning machine enquire of T. E. Thomson & Co. Ltd., 9, Esplanade East, Calcutta.

1027 M.I., Sargodha—We have no book on power alcohol manufacture. Power alcohol is manufactured from molasses which may be had from sugar factories. For machines you may enquire of Adair Dutt & Co. Ltd., Stephen House, 4, Dalhousie Square, Calcutta.

1032 H.M.A., Bombay—Process of colouring plastic buttons will appear in Formula Section in due course.

1042 N.S.A., Bombay—You perhaps mean naphthalene balls. Process of manufacturing naphthalene balls appeared in April, 1948. issue of Industry. Process of making kanku will appear in Formula Section in due course.

1049 T.B., Secunderabad—You may use orange and yellow in equal proportion.

1050 U.S.P., Rai Bareli—An article on ink powder manufacture appeared in May, 1949, issue of Industry where you will find formulas of blue black ink powder.

1054 N.D., Dindigul—Soak wheat or barley in water then place these wheat or barley in rather warm place when these will germinate. For bedbug killing you may use DDT powder along with slaked lime powder. Asafoetida is obtained by wounding the upper part of the root, from which a small quantity of gum escapes and is collected. The living root is then sliced daily or every two or three days with the exudation adhering to it, till exhausted. Whole mass consisting of alternate layers of root and gum resin is packed in skin. As found in the market, the resin consists of root and gum resin is packed in skin. As found in the market, the resin consists of blackish brown brittle mass of extremely fetid odour always mixed with slices of the root.

1056 R.C.P., Neora—Cotton thread making machines may be had of W. H. Brady & Co. Ltd., Mercantile Bldgs., Lall Bazar, Calcutta. You may manufacture varnish from rosin and lac.

1057 S.V.I.W., Vizianagram City—Tin can making machines may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta and Marshall Sons & Co. Ltd., 99, Netaji Subhas Road, Calcutta. Above firms will supply you with estimate for starting a factory with their machines.

1061 V.N.B.D., Sangli—Process of manufacturing all sorts of confectionery will be found in Manufacture of Confectionery published from this office, price Rs. 3/7/- including postage.

1062 C.M.H., Delhi—Following is a formula of green blanco. White clay 16 oz.; Spanish whiting 8 oz.; flake white 6 oz.; precipitated chalk 4 oz.; powdered tragacanth 2 oz.; carbolic acid 2 dr.; green pigment 1 oz. Mix the powders and knead with water. Divide the paste into small pellets and cast each into suitable moulds.

1066 M.R., Bhagalpur—We are not aware of any chemical that will convert syrup to milk white colour.

1068 R.K.T., Poona—Following is the process of making magic writing slate: Cardboard is coated with following composition and covered with a sheet of waxed or oiled paper or cellophane. When the letter is written in with a stylus or pencil the writing appears. When this sheet is lifted away from the coated cardboard the writing disappears: Beeswax 4 parts; Venice turpentine 7 parts; Lard 4 parts; China clay 3½ parts; Carbon black 1 part; Mineral oil 2 parts. The consistency may be varied by varying the proportions of liquid. Following is a formula of liquid glue: Gum acacia 100 parts; water 140 parts; dissolve and add glycerine 10 parts; acetic acid (33 per cent.) 20 parts; aluminium sulphate 6 parts. Set aside for a few days.

1072 S.R.E.W., Vizianagram City—Salt is required for manufacturing washing soda processes of manufacturing washing soda will be found in Chemical Industries of India published from this office, price Rs. 3-7 including postage.

1073 P.P.A., Ludhiana—Spirit red is spirit soluble red colour which is in powder form which is weighed in grain.

1075 E.F.P.C., Kandy—Mantles are knitted from ramie fibre or artificial silk yarn. For artificial silk yarn enquire of Kundanmal Ramlal, Souri Bldg., 78/80, New Hanuman Lane, Bombay and Hazarat & Co., People's Bldgs., Sir P. Mehta Road, Fort, Bombay. Knitting machine is required for the above purpose. Knitting machines may be had of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta. We have no book on the above subject. You may consult Rare Earth Industry by Martin.

1077 R.A., Montogomery—Process of manufacturing catgut, vaseline, etc. will appear in Formula Section in due course.

1080 K.C.A.S.N., Sivakasi — We are not aware of any machine or instrument which will help you in polishing the tiles.

1081 B.K., Calcutta—Reply to your question has already been supplied.

1086 G.C.M.C., Abohar — For painting a motor car you should use nitrocellulose lacquer.

1088 B.M.P., Kanpur—You may put any enquiry of industrial or commercial subject when we shall try to solve this to your satisfaction.

1091 A.M.C., Kailashar — All kinds of vegetable oils may be treated with sulphuric acid for refining.

1093 G.L.P., Lucknow—Salt and myrobalans should be equal in quantity and should be heated in an iron pan. There is no such thing as essence of coconut oil. For ice cream making you should invest at least Rs. 12,000.

1094 N.C.F., Wennappuwa—For starting a washing soap factory you have to invest at least Rs. 1,000 for machinery. For machinery enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

1095 K.A.M., Tinnevelly—You may use hydrofluoric acid for etching or engraving glass.

1096 C.L.F., Kalutara—Following is a formula of slate pencil: Ground slate 60 parts; ground lime stone 30 parts; silicate of soda 10 parts. Knead the ingredients together in a plastic mass and then forced through a perforated plate. The pencils are next cut into desired sizes when dry. The shaping is done by laying the pencil in a trough the bottom end being gripped automatically in a holder which revolves at an angle, and the end is held against a rough stone revolving at high speed in water. Process of manufacturing slate will be found in Manufacture of Slate published from this office.

1100 S.A.V.M., Arattakatta — Process of manufacturing confectionery will be found in Manufacture of Confectionery published from this office, price Rs. 3-7 including postage. Raw materials may be had of Raja Ram & Co., 37, Grant Street, Calcutta. For machines enquire of Small Machineries Mfg., Co., 22, R. G. Kar Road, Calcutta. An article on tooth powder manufacture appeared in May, 1949, issue of Industry.

1105 A.B., Banaras—For glassware enquire of Bharat Glass Works Ltd., Belgharia, West Bengal; Victoria Glass Works, Ghoosery, Howrah and Sree Gobindeo Glass Works, Ramrajatola, Howrah.

1110 P.S., Ferozepur Cantt—For fountain pens enquire of following firms: Bharati Stores, 86-4, Harrison Road; Dhar Bros., 82, Harrison Road and College Stores, 55, College Street, all of Calcutta. Ink also may be had of the above firms. Shoes may be had of A. B. Sadik Bros., 10, Lower Chitpur Road; A. K. Leen & Co., 85-B, Bentinck Street and Achin & Co., 85, Bentinck Street, all of Calcutta. For hosiery write to A. Ebrahim & Bros., 15, Zakaria Street; Bardhan & Co., 36, Chandni Chowk; Ferozuddin & Co., 7, Colootola Street and Gambhirmull Mahabir Parsad, 80, Colootola Street; all of Calcutta. All other addresses you require will be found in Industry Year Book and Directory published rom this office.

1112 C.R.F.G.O.M., Ponduru — It is not possible to send diagrams of distilling plants. For distilling plants and other apparatuses enquire of Adair Dutt & Co. Ltd., Stephen House, Dalhousie Square, Calcutta: India Scientific Stores, 12-2, Old China Bazar Street and Scientific Instrument Co., Ltd., 11, Esplanade East, all of Calcutta.

1122 U.C.P., Darbhanga—We have no book dealing with washing cothes. You may however enquire of Thacker Spink & Co., (1933) Ltd., 3, Esplanade East, Calcutta and Standard Literature Co., Ltd., 13-1, Old Court House St., Calcutta.

1125 G.S.S., Maldah—For particulars regarding village or cottage industries write to the Secretary, All India Village Industries Association, Maganwadi, Wardha, C.P. As regards Bengal write to The Director of Industries, W. Bengal, 7, Council House Street, Calcutta 1. You may also regularly go through Industry.

1127 M.J., Nadiad — Process of manufacturing sugar candy will appear in Formula section in due course.

1129 C.L.D., Jaipur—Following is the process of manufacturing ivory from potato: Make a solution of 4 parts of sulphuric acid in 50 parts of water. Take every precaution, so that the vessel may not break up owing to the evolution of heat. Now treat peeled potatoes with this acid solution for 36 hours. Dry the mass between blotting papers and subject to great pressure whereby thin sheets are obtained resembling ivory.

1133 M.V.B.R., Ganjam—We have no book on printing roller casting. You should buy some roller casting moulds and arrange with local printing presses for supplying their roller. Rubber stamp making appliances may be had of B. Goray & Co., 156, Cornwallis Street, Calcutta. Process of manufacturing rubber stamps will be found in Manufacture of Rubber Goods published from this office, price Rs. 3/7/- including postage. Card board box making machines may be had of Oriental Machinery Supplying Agency Co. Ltd., P12, Mission Row Extension, Calcutta. For small printing machine enquire of India Machinery Co. Ltd., Dassnagar, Howrah.

1136 M.M.R., Chittagong—Your previous letter is not traceable.

1138 V.C., Gadag—Empty match boxes, cigar packets, gramophone pins have no commercial use.

1141 A.K.S., No address — Following is a list of radio institutes: Radio College, 191-1, Bow Bazar Street; Eastern Institute of Technology, 58-B, Rash Behary Avenue and George Telegraph and Training Institute, 126, Bow Bazar Street; all of Calcutta. Following is a list of radio dealers: Philips Electrical Co.

(India) Ltd., 2, Heysham Road; Radio Clinic, Serajuddin Mansion, 73, Dharamtala Street and Radio & Television Corporation, 78, Dharamtolla Street; all of Calcutta. Following is a list of general merchants: Associated Distributors Ltd., 32-A, Dharamtala Street; East India Trading Co., 2, Church Lane and Indian Trading Co. 14/2, Old China Bazar Street; all of Calcutta.

1143 C.M., Uganda—Process of manufacturing rubber solution will appear in formula section in usual course. For rubber solution enquire of Dunlop Rubber Co. (India), Ltd., 57-B, Free School Street, Calcutta and Travancore Rubber Works, Post Box No. 15, Trivandrum, Travancore.

1154 B.L.M., Simla—There is no arrangement for giving practical training in match manufacture and fountain pen manufacture. You have to invest at least Rs. 1 lakh for each item. You will get 15 p.c. profit on sale. For starting match manufacturing you have to secure permission from Government. For securing services of an expert advertise in newspapers.

1156 B.S.C., Poonamallee—Match making machines may be had of Standard Machinery Co., 86-B, Netaji Subhas Road, Calcutta and Harima Engineering Works, 69-1, Belgachia Road, Calcutta. For nib making machine enquire of Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta. Sealing wax moulds may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. For other machines enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1158 M.I., Sargodha—You may consult the following journals: Electrical World, New York, U.S.A.; Popular Mechanics' Magazine, Chicago, Illinoise, U.S.A. and Scientific American, New York, U.S.A.

1161 M.D.S., Lahore—You may consult Wide World English Correspondence by K. M. Banerjee, price Rs. 3-15 including postage. For other books enquire of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

1164 D.C., Lucknow—You may go through Manufacture of Safety Matches and Their Manufacture, published from this office, price Rs. 5-8 including postage. We do not publish any book in Bengali. Process of manufacturing cigarette lighter will appear in Formula Section in due course.

1169 R.H., Jaunpur—For ink pots enquire of the following firms: A. M. Dadabhoy, 55, Canning Street; Jai Hind Bottle Agency, 27, Pollock St. and P. N. Dutta, 195, Old China Bazar Street; all of Calcutta.

1172 M.R., Rawalpindi—Following is a formula of orange syrup: Tincture orange 1 oz.; ordinary syrup 7 oz. Prepare ordinary syrup by boiling sugar in water in the proportion of 1 of sugar to 3 of water. To every 7 oz. of the syrup now add 1 oz. tincture of orange, which gives the required syrup.

1174 J.R.P., Kampala—Please let us know in what particular line you are interested when we shall send you detailed information.

1175 G.C., Banaras—Process of delustring artificial silk will appear in Formula Section in due course.

1177 A.P.S., Lashkar—For foreign addresses write to Consul General for U.S.A., 9-10, Esplanade Mansion, Calcutta; Consul-General for Belgium, 24-1, Alipur Road, Calcutta. Machines are not available in India at present, however you may enquire of Volkart Bros., 8, Netaji Subhas Road; Francis Klein & Co., Ltd., 1, Royal Exchange Place and Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, all of Calcutta.

1184 S.I.A.S., Lahore—Sugar should be boiled at 310° to 320°F in manufacturing dreps. You may use 25 p.c. glucose.

1190 S.S., Neemuch—For machines required enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension; Alfred Herbert (India), Ltd., 13-3, Strand Road; Francis Klein & Co., Ltd., 1, Royal Exchange Place and Jessop & Co., Ltd., 93, Netaji Subhas Road; all of Calcutta. These firms will supply you with prices of their machines along with the estimates for starting factories. As regards experts you should advertise in newspapers. There is no arrangement for teaching the industries practically.

1191 M.S.S., Sylhet—Soap making materials may be had of Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta.

1196 J.S.M., Balaghat—Formulas of pain balm, hair oil, vanishing cream, etc. will appear in Formula Section in due course.

1200 K.B.R., Vizianagram—You may consult Manufacture of Syrup and Cold Drinks published from this office, price Rs. 3/7/- including postage. For aromatic chemicals and alcohol enquire of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta. For labels and blocks enquire of N. De & Co., 1/1, Bhim Ghose Lane, Calcutta. For tin printing ensuire of National Sheet & Metal Works Ltd., 36A, Sahitya Parishad Street and Metal Box Co. of India Ltd., Hide Road, Kidderpur, Calcutta. Ink may be

filled in stonewares or porcelain wares which may be had of Art & United Potteries, 9, Ezra Street; Bengal Potteries Ltd., 45, Tangra Road and India Potteries, 91, Dharamtala Street; all of Calcutta.

1203 R.V., Coimbatore—For fret work tools enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1204 A.C., Aligarh—Reply to your letter has already been sent by post.

1205 K.V.J., Poona—Process of manufacturing artificial fruit essences will be found in Manufacture of Syrup and Cold Drinks published from this office, price Rs. 3-7 including postage. As regards cultured pearls of Japan addresses are not available at present.

1218 N.P., Kunhuri—For learning dentistry you may enquire of the Principal Calcutta Dental College & Hospital, 114, Lower Circular Rd., Calcutta.

1219 K.R.R., Samalkot—We have no book on brush manufacture. You should advertise in newspapers for selling brushes.

1224 B.P.G., Allahabad—Refer your query to the Association of Medical Practitioners, Lucknow.

1228 A.S.A.C., Agra—Process of manufacturing varnish will appear in Formula Section in due course.

1230 R.K.T., Poona—Vermicelli and macarani are prepared by the same process only different machines are used. Vermicelli making machines may be had of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1236 L.R.C., Chatrapur—Following is a formula of tempering powder: Animal charcoal 24 lbs; horn filing 4 lbs, glue 6 lbs; potassium nitrate 9.5 lbs. and sodium chloride 55 lbs.

1237 S.B.C., Howrah—For manufacturing snuff you should use Guntur quality tobacco which may be had of Chandajee Khubajee & Co., Guntur and Chintakrindi Kanakaiah Co., Mangalagiri, Guntur. As regards process no better one is available.

1238 G.S.K., Bombay—Paper clip making machine is not available in India at present. You may however enquire of Baird Machinery Co., Bridgeport, Connecticut, U.S.A.

1239 Y.V.M., Nadiad—We are not aware of any machine which is used in manufacturing sugar candy.

1241 A.T.C., Firozabad—Process of manufacturing liquid gold will appear in Formula Section in due course. Liquid gold is not manufactured in India at present.

1243 H.P.D., Karimganj—Process of manufacturing distilled water appeared in October 1948 issue of Industry.

1244 A.I.W., Muzaffernagar—Following is the process of manufacturing rubber solution: Fresh raw rubber cut in small pieces is placed in a bottle of naphtha or benzine in the proportion of 1 part of the former to 5 of the latter. The rubber gradually swells absorbing the solvent and eventually loses its tenacity. Now the mass on vigorously stirring or the bottle on shaking at a certain stage and this treatment repeated from time to time, an apparently homogeneous solution is finally obtained. Thin rubber solution is very sticky and tenacious. But if the raw rubber is not fresh it is better to masticate it in a kneading machine whereby it is reduced to impalpable paste. Now take 1 part of this paste and put it into 5 parts of naphtha or benzine contained in a suitable bottle. Shake for a while. The rubber readily goes into solution in a less viscous mass than untreated rubber.

1248 A.H., Berhampur—For ice candy making machines enquire of Refrigeration & Air Conditioning Industries Ltd., 34, Ezra St. and Refrigerators (India), Ltd., 59-C, Park St.; both of Calcutta.

1254 O.P., Udaipur—You may insert company to your firm's name, there is no restriction. Process of manufacturing washing soap appeared in February 1949 issue of Industry. You may consult Indian Women's Magazine, P.O. Box No. 311-A, Bombay and Didi, Allahabad.

1259 M.H.M., Morvi—An article on candle manufacture appeared in May 1949 issue of Industry. Candle making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. Hard paraffins and wicks are required as raw materials.

1261 A.G.M., Vaniyambadi—For supplying herbs and drugs you may negotiate with the following firms: Banshidhar Dutt, 126, Khengrapatty Street, Barrabazar, Calcutta; Indian Herbs Research & Supply Co., Choharpur; Dehra Dun and P. C. Dawn & Co., 1, Mechua Bazar Street, Calcutta.

1263 J.M., Madras—All the ingredients you require may be had of Abinash Chandra Dutta, 81, Shambazar Street, B. K. Dutt & Co., 35, Netaji Subhas Road, and Koylash Chandra Dutt & Sons, 20, Bonfield Lane; all of India.

1264 N.C.C., Calcutta—Formulas of alta, bindi, nail polish, etc., will be found in Indian Perfumes, Essences and Hair Oils published from this office, price Rs. 3/7/- including postage.

1267 J.D.B.C., Ambala Cantt.—Process of purifying old honey will appear in an early issue of Industry.

Review of Books

PRINTERS' GUIDE. Published by the Eastern Type Foundry & Oriental Printing Works Ltd., 15, Brindaban Basak St., Calcutta. Pages 263, price Rs. 4/16/-.

A time was when the profession of a printer was considered to be an ignoble and unworthy one. But there has been of late a complete change in their outlook. Millions of our countrymen, are, at present, earning their livelihood by embracing this avocation. We have, at last, realised to our benefit that printing is a part and parcel of modern civilisation. But systematic training is indispensable, if we have to bring about any real improvement in this direction. Mere technical training will hardly suffice to foster in them a creative idea about possibilities of improvements.

Considered from that standpoint "Printers Guide" is a real asset. It is useful mainly from two considerations. Firstly, because it is extremely vivid and concrete, full of griphic details and particulars about art of printing. Secondly because it is written in plain and lucid Bengali intelligible to the average Bengalee readers. We admit there is plenty of books on this subject in western languages. But they do not always answer to our peculiar needs and requirements. Mr. G. Dey is in a better position to gauge aright the peculiar problems and difficulties of Indian pressmen.

We congratulate Mr. Dey as the pioneer in his line. We congratulate him because he has brought his vast experience and knowledge to bear upon this work.

The book is highly comprehensive, embracing the entire range of technicalities, regarding composing, galley proof, make-up, proof reading, etc.

The book, we think, will be highly useful to pressmen. We highly recommend it to the interested readers.

POST-WAR GUJERAT. Published by Dr. A. L. Trivedi, Khalsa College, Bombay. Pages 289, price Rs. 19/8/-.

In the new socio-economic set-up a new fundamental approach should be given to our economic revival and reconstruction. But development plan can never materialise, unless there have been adequate preliminary preparations.

Preliminary preparations, consist in collection and collation of vital agricultural and industrial statistics and investigation of the economic potentialities. Intensive surveys and investigation, will, in the first instance, be necessarily confined to narrow and restricted lines to ensure correctness and accuracy of information.

And we are glad to find that Mr. Trivedi, author of postwar Gujerat and several other books is one of those pioneers who are carrying on intensive research in these directions. And the fruits of this research have been incorporated in his books.

In his preface Mr. Trivedi rightly observes that research is sine qua non of our economic advancement. And it is really impossible to define the exact pattern and frame-work of the productive machinery without reference to the resources and potentialities. The very fact that he makes a strong plea for a golden mean-a mean between full scale industrialisation and wholesale cottage industrialism testifies to his sound and mature judgment. All throughout his study, he has been convinced of the necessity of cutting a mean between total industrialisation and a total turn-about towards handicrafts in all possible fields.

Post-war Gujerat is a comprehensive economic survey, embracing in it important and vital information regarding trade and industries of this province. The scheme of this treatise may be explained as follows:—Chapter I. gives the economic background; Chapters II, and III, discuss the problems of agriculture and industries, allied to agriculture. Chapters IV. to IX. deal with problems of various industries. In Chapter X. an attempt is made to view synthetically the problems of economic development in Gujerat with reference mainly to (a) population and food supply (b) industrialisation (c) income and standard of life of the people.

No doubt, there have been isolated and scattered surveys pertaining to Gujerat during the last fifteen years. Indeed, they throw light on the various aspects of the economic conditions. But they cannot claim to be comprehensive. In this respect "Post-war Gujerat" holds a unique place. We commend it to the readers .

NOTICES & REVIEWS

(Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medical preparations and allied substances in this sections.)

WRITING INKS

We are glad to receive from Messrs. Chakraborty & Sons, 12-D, Raja Kali Kissen Lane, Calcutta 5, 1 pint bottle blue-black and 1 pint bottle red writing inks, which are found to be good.

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1258 B. Bros., G. T. Road, Yellamanchili, S. Vizag.—Want to be put in touch with fibre merchants of Kanpur and other places.

1404 S. R. G. Syndicate Ltd., 9, Old Court House Street, Calcutta 1.—Want to be put in touch with hurricane lantern dealers at Singapore, Rangoon, Colombo and Far East.

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MONTHLY MAGAZINE

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EDITORIAL CONTENTS FOR AUGUST, 1949.

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Subscribers are enlisted at any time of the year for a period of 12 months. Subscribers will receive 12 issues in all beginning with the issue for the month of enlistment. Subscribers are not enlisted for any period less than a year.

Subscription money is always payable in advance or by V.P.P.

ADVERTISEMENT DEPARTMENT.

Last day of accepting advertisement is the 10th day of the previous month. Any order for alteration or correction of copy is not entertained after that day.

Advertisement rates for ordinary and special position, both casual or contractual, are sent on request.

CORRESPONDENCE.

All enquiries regarding industrial or business information should be addressed to the Editor. Contributions and articles for review and notice should also be sent to him.

All enquiries regarding the Subscription or Advertisement Departments should be addressed to the General Manager.

OFFICE HOURS.

Editorial Department — 11 A.M. to 4 P.M. on weekdays and 11 A.M. to 2 P.M. on Saturdays.

Subscription and Advertisement Department — 10 A.M. to 5 P.M. on weekdays and 10 A.M. to 2 P.M. on Saturdays.

CLASSIFIED BARGAINS

ADVERTISEMENTS under this head of small announcements cost 4 As. per word, minimum Rs. 3 payable by Postage Stamp or M.O. with order. No vouchers given.
To Readers—In writing to advertisers the Readers are requested to write legibly and quote that they are writing in response to advertisement in INDUSTRY. This would ensure prompt attention. Letters to Advt. No. should be duly stamped.

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AGENTS WANTED.

AGENTS WANTED.

Bangalaxmi Leather Works, 10/B, St. James Square, Calcutta—Wanted Stockists for money Purses & Ladies Hand Bags. 754 AA

"Penguin" Solid Stencil Ink. Wanted Agents. Apply Senco, 49, Sastitala Road, Calcutta—11. 678 AA

Deluxe Tea Corporation Ltd. 266A, Chittaranjan Avenue, Calcutta, Want Stockists & Agents everywhere 845 AA

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Can Supply Candles at moderate price Stockists wanted Sample Re 1/- Lokenath Industries. 18, Ramlal Bose Lane, Radhanagar Burdwan. 593 AA

Wanted Stockists for our Tiger Brand Boat Shape Bed Room Lamps. Peermohamed & Co., 287, China Bazar Road, G T. Madras 878 AA

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Wanted Wholesale Buyers and Stockists for all varieties of Mirrors, Plastic Bangles Combs Hair Pins & Clips etc and Plasticware Novelties. Inquiries invited The Commercial Corporation, Ganeshwadi, M J Bldg, 3rd Floor, Bombay 2 857 AA

Wanted Agents, Stockists, Canvassers both Ladies and Gents throughout India and Pakisthan on Commission basis and salary for Mangal Malam, Mangal Balm & Medicines. Apply to—Mangal Stores, 19, Banstola Lane, P O Barabazar, Calcutta—7 630 AA

R. C. Chemical Works, 150/1B, Amherst Street, Calcutta, Factory — 128/1, Bowbazar Street, Calcutta Manufacturers of. Phenyle, Soft soap, Monopoly soap, Liquid soap & Carbolic Liquid Soap. Wanted Stockists & Agents 591 AA

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Wanted District Agents & Stockists on Commission for U P and Madras Presidencies to sell our products (Injectables, Medicinal specialities, Urea-Stibamine etc, etc) Apply stating past experiences to Chemo-Therapeutics (India) Ltd, Calcutta—5 884 AA

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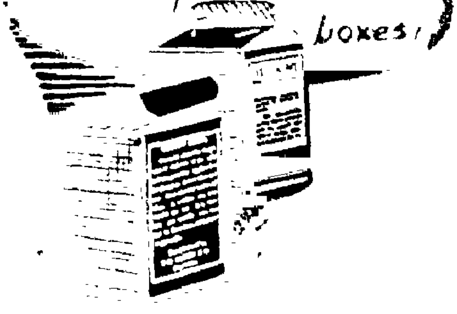
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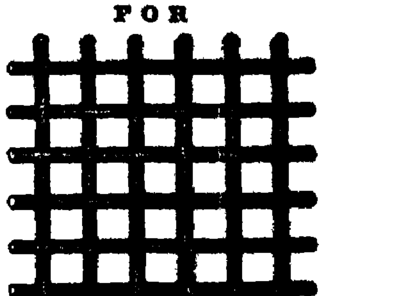
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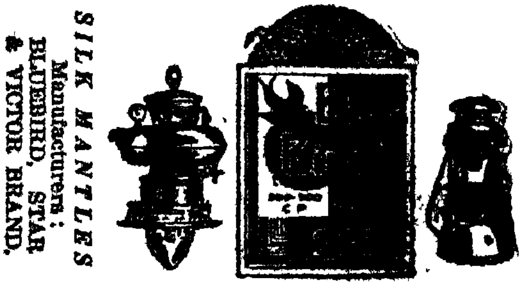
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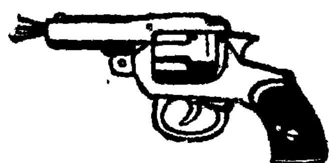
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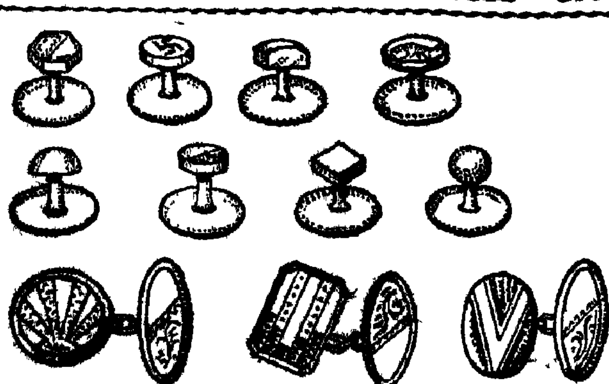
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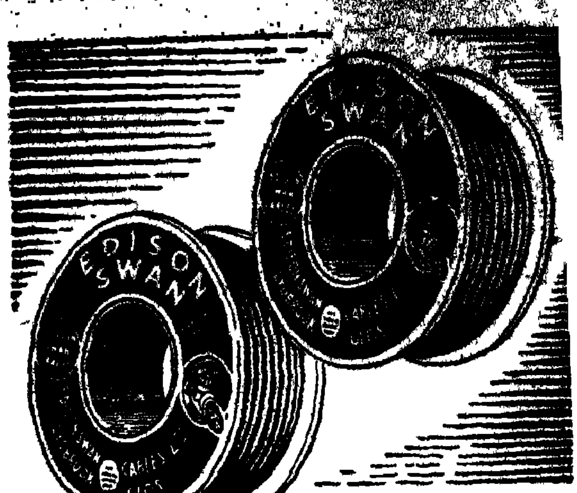
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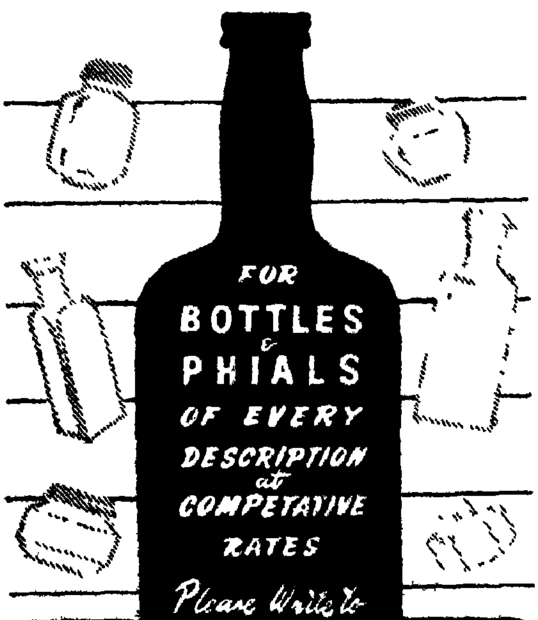
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(1) ASSISTANT FOREMAN (Smithy) : Academic qualifications : (i) Matric minimum, (ii) A degree or full course diploma in Mechanical Engineering from a recognised engineering Institution : Degree holders preferred, and (iii) Training in approved apprenticeship course for 5 years including one year in drawing office of a recognised engineering concern. Candidates should also have seven years experience, subsequent to apprenticeship, as all round Mechanical Engineers of which at least 2 years should have been spent in Smithy Shop of a big manufacturing concern, specializing in Smithy practice with sound knowledge of the flow of metals, in forging in all branches including drop stamps, in working of Gas and oil furnaces and in metallurgy. They shuold also be good disciplinarians having ability to ccontrol their labour and to organize office work in accordance with factory procedure and practice.

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Industry

EDITOR:
K. N. BANERJEE.

VOL. XL. CALCUTTA, AUGUST, 1949. No. 473.

A PLEA FOR COTTAGE INDUSTRIES

UNEMPLOYMENT, the gravest social menace, has assumed serious proportions to a poignant sense of frustration and wastage among the youth.

We are aware, that unemployment comes, inevitably and naturally in the wake of war-inflated economy, when all productive enterprises contract, even close up.

To avert the undesirable consequences of such contraction in productive enterprises it rests with the Government as well as the industrialists of the country to divert the whole economy of the country into a creative and constructive channel so as to heal up the scars and ravages of war.

India Government, of course, have undertaken big development projects which will surely ensure the absorption of a large section of the unemployed. But the projects are scarcely enough for the maximum employment and utilisation of labour, talent, and all the resources lying untapped and unexplored.

Under these circumstances, Government will do well in encouraging to set up a net-work of cottage industries on co-operative basis, both in rural and urban areas, increase the productive capacity of the country and also absorb vast number of population which still remain unemployed.

Unemployment, particularly among the educated middle class, is the most unfortunate phenomenon. It is a sign of deep anguish, that even at this hour of crisis they are showing a lamentable absence of adaptibility and elasticity.

Certain sections of cottage industries still remain where they are. It is high time that they should employ their superior intelligence and creative mind to their own benefit and to the welfare of the country as a whole.

CURRENT TOPICS

TECHNICAL PERSONNEL

The problem of technical personnel we are aware, is closely bound up with economic advancement of the country. In fact, want of adequate technical personnel is proving one of the major handicaps to speedy reconstruction and development. It is with the object of eliminating this great handicap that All India Council for Technical Education was set-up in 1945.

This Council, has, however, nothing very substantial and remarkable to its credit. But as Mr. N. R. Sarkar points out, it has vast scope and possibilities in future, provided the activities of the Council are carried on sound and realistic principles. Mr. Sarkar rightly observes "Now that India is free, the Council are consequently free from the inhibitions and restrictions which impeded its progress and can therefore carry on its operations unfettered.

In this connection, he emphasises that every technical system of education, should keep in view mainly two aims, e.g. (1) The basic and paramount need is, the proper correlations of our education with our industrial and agricultural requirements. (2) Secondly, technical instruction should be broad-based and considered as a form of mental training. Any technical system of education, divorced from these basic principles, is likely to prove futile.

INTERNATIONAL COMMISSION OF IRRIGATION AND CANALS

A move by the Government of India for the formation of an International Body to be called the "International Commission of Irrigation and Canals" with its headquarters in India has met with favourable response from many countries, it is reliably learnt. India has invited the co-operation of 48 countries.

Mr. A. N. Khosla, Chairman of the Central Weather Power Irrigation and Navigation Commission, who has left Bombay recently for Europe in connection with the meeting of the U.N.E.S.C.O. Committee in engineering sciences will take the opportunity of discussing India's proposal with them.

The main functions of the International Commission of Irrigation and Canals as envisaged by India will be to encourage study of the design, construction, maintenance and operation of large and small irrigation works and canals including navigation canals and to collect all relevant information on this subject.

DAMODAR VALLEY PROJECT

Mr. Phulan Prasad Verma, Member of the Damodar Valley Corporation describing the man features of the Damodar Valley Project in an interview to the P.T.I. said that "It is a new economic experiment on semi-socialist lines."

"There are three main features", Mr. Verma said, "Firstly, it is the first experiment of its kind in decentralised public administration on T.V.A. lines. Secondly, it is a new economic experiment on semi-socialist lines. It is not an ordinary commercial organisation. It is a non-profit making organisation charged with a responsibility for the industrial, economic and social welfare of the entire Valley. Thirdly, it is a multi-purpose scheme aiming at the comprehensive development of the resources in the drainage basin of the

Damodar and its tributary which roughly cover an area of about eight thousand square miles.

The project includes the construction of eight multi-purpose storage dams with hydro-electric plants, steam power plants at Bokaro with a total capacity of two hundred thousand killowatts, irrigation barrages, and 80 miles long canal and transmission system for the present covering about 300 miles going south as far as Jamshedpur, the steel town of India, and east as far as Asansol.

Mr. Verma said that it was estimated that an area of about 150 square miles would be submerged by the eight dams that were to be constructed by the Corporation and would cause displacement of about 75 thousand people.

"The backbone of the power system of the Valley", Mr. Verma said "would be the thermal plant at Bokaro. The Corporation has already signed a contract for its construction with the International General Electric Company of America. This plant would use only pulverised coal instead of metallurgical coal.

AGRICULTURAL ECONOMY OF INDIA

The Agrarian Reforms Committee, appointed by the Congress, has, it is learnt, made recommendations of far-reaching character to stabilise the agricultural economy of the country.

Abolition of absentee landlordism, fixation of remunerative prices for agricultural products and minimum wages for agricultural labour and organisation of separate unions for agricultural labour are among the main recommendations of the Committee.

Mr. J. C. Kumarappa, Chairman of the Committee is expected to present the report to the Congress President Dr. Pattabhi Sitaramayya.

Prof. N. G. Ranga, Member of the Congress Working Committee, and Mr. O. P. Ramaswami Reddiar, former Premier of Madras, who are Members of the Agrarian Reforms Committee, have in their minority report expressed fundamental difference with certain recommendations of the majority.

While the majority report recommends making co-operative joint farming compulsory, Mr. Ranga and Mr. Reddiar favour it being made voluntary and really co-operative. On the question of conferment of the right of cultivation on tenants, Mr. Ranga and Mr. Reddiar hold that the tenant should have been on the land for not less than twelve years as against six years period suggested in the majority recommendation.

Prof. Ranga and Mr. Reddiar in their report suggest the establishment of commodity credit co-operation on the line of the American system to give "price support" to staple agricultural products. They also recommend a net work of warehouses and granaries to hold buffer stocks and also to serve as grain banks during times of scarcity and famine. They stress State undertaking of crop and cattle insurance immediately without waiting for agrarian reforms to be completed as suggested by the majority.

In respect of proprietary rights in land for the peasants, the majority considers that the land belongs to the village community and ryots have only cultivating rights. The minority differs from this view as it goes against section 24 of the Draft Constitution because it takes away proprietary rights without payment of adequate compensation.

INDO-GERMAN TRADE PACT

The Government of India have approved the new trade agreement with the U.S.U.K. French Zones of Germany

which was signed at Frankfurt on June 23. The programme provides for a balance of trade of approximately rupees twelve lakhs in favour of India. Exports from India are estimated at 1,292,500 dollars. Over and above the figures provided for in the agreement India has offered to meet Western Germany's additional demands for castor seeds, crushed bones, hide cuttings, crude drugs and palmyra fibres. The programme is due to remain in force up to the end of June 1950.

India has agreed to export to Western Germany chemicals including castor seeds, crude drugs and essential oils to the value of 1,325,000 dollars, textiles to the value of 5240,000 dollars, fibres and bristles of 490,000 dollars, manganese ores of 450,000 dollars, mica of 1450,000 dollars, hides and skins of 1425,000 dollars, stones and earths of 52500 dollars, food and agriculture products, of 3100,000 dollars and miscellaneous commodities like birds feathers, cattle horns, mother of pearl, stones, sausage eatings, and wild animals to the value of 440,100 dollars.

Imports from Western Germany include chemicals and related products to the value of 2,209,000 dollars, machinery and metal products of 6,820,000 dollars metals of 500,000 dollars, instruments and apparatus of 550,000 dollars and iron and steel 2,500,000 dollars.

Grant of licences is subject to negotiation of contracts which are mutually satisfactory regarding specifications, prices, delivery and other items.

RADIO-MANUFACTURE IN MYSORE

In a large number of commodities, we entirely depend upon the foreign countries. Radio constitutes one such requirement. So any move for removing this dependence is always commendable.

It is, therefore, gratifying to learn that the Radio and Electrical Manufacturing Co., sponsored by the Govt. of Mysore, would appear to have gone into production now and it is announced that the company hopes to put on the market by October this year, radios completely assembled in its factory. For the time being the company will confine itself to the assembling of radios from imported parts, but in another five years it is claimed, it will manufacture all component parts except valves. The aggregate capacity of the factory is put at 100,000 radios, which, when manufactured will more than meet India's present annual demand of 65,000. In the first year about 15,000 radios are expected to be assembled.

The company is stated to have executed an agreement with the International General Electric Company of the U.S.A. for necessary technical assistance. Already two foreign experts are now employed in the factory and six Indian engineers who were sent abroad for special training by the company are on the job. Despite this, the general progress could not be speeded up, still further owing to dollar exchange restrictions and the Govt. of Mysore is now reported to have taken up this matter with the Govt. of India. It is to be hoped that this vast industry will be given such facilities as are within the means of the Centre at present to establish itself.

FORECAST AND AGRICULTURE

"The steady deterioration of physical and climatic conditions, the slow drying up of springs, the silting of water channels, dams and river-beds, gradual loss of the fertile top soil from sloping ground, the depositing of sand drifts on cultivated fields, the increasing scarcity of timber, fire-wood, fodder grass and other forest

produce, these are all caused by the devastation and abuse of forests." Thus observed Mr. C. R. Ranganatham, President of the Forest Research Institute and College, Dehra Dun in his speech delivered at the Annual Convocation of the Forest College at Coimbatore.

This observation made by such a great expert should be taken as a timely warning to those that injudiciously destroy and misuse forests.

Even a layman not equipped with any scientific knowledge knows what a wealth of timber, fuel, lac, medicinal herbs and eatable fruits, roots and vegetables a forest is capable of yielding. Destruction of a forest means this loss of wealth.

Again, devastation of forests injure the cause of the very thing for the good of which the policy of destruction is adopted. The gain in the quantity of agricultural lands resulting from the adoption of the policy is almost invariably attended with loss in their quality, as destruction of forests removes influences helpful and produce influences harmful to agriculture.

So a scientific calculation of gain and loss must be the basis of dealing with the problems of forests and agriculture.

NEW SYSTEM IN JUTE CULTIVATION

Mr. J. B. Lakhani, Secretary, Indian Central Jute Committee, expressed deep satisfaction at an all-out drive being made by the Central Ministry of Agriculture towards attainment of self-sufficiency in respect of raw jute requirements. Mr. Lakhani evidently seemed to be highly optimistic of the future raw jute prospect. And his optimism is found to have a real basis. Firstly, there is a definite increase in jute production during the past two years and secondly new progressive measures are going to be adopted.

The new system of cultivation, as introduced by the agricultural institute and referred to by Lakhani is of real significance to future jute prospect in India. This new system, it is expected, will bring benefit to the jute grower, in that he may expect lower cost of cultivation, better yield of crop and improved quality of raw material.

One of the factors expected to enrich the crop is reformation in the system of sowing. Jute, all are aware, is usually sown broadcast and when the seedlings grow, they are thinned out by transplanting them over a wider area.

This involves a certain amount of wastage of seed and requires hand labour at the time of weeding. Under the new plan jute is grown in line and not broadcast, seedlings being sown three to four inches apart in furrows, drawn out at intervals of one foot. In jute thus sown all subsequent operations, such as periodical weeding between the beds are done by means of wheel hole, to which reference has erenow been made in these columns

In order to popularise this system of cultivation, the Indian Central Jute Committee has supplied as preliminary measure 50 wheel holes to the cultivator in jute growing provinces.

Another notable direction in which progress has been made towards the achievement of self-sufficiency in jute is evolution of an improved type of jute seed as a result of research in this institute.

This seed, used in the new method of cultivation yields, we are told, 25% higher crop than seeds hitherto used.

In view of the impending jute crisis this new system assumes great significance.

TIMBER TO REPLACE STEEL

Dr. S. Kamesam, Timber Expert to the Indian Government, who has been specially commissioned to prepare a

scheme for the use of treated wood in place of steel, says that timber may replace steel in many structural works. In a variety of ways, opines Dr. Kamesam, preserved and treated wood and pressurised bamboo can take the place of steel, and, he adds, the world's timber and bamboo reserves are inexhaustible, in contrast to the fast drying up resources of coal and iron. It is significant that the proposed timber-for-steel scheme will be of help not merely to India but to all undeveloped and underdeveloped countries as well.

Dr. Kamesam has a four-point plan in this connection. Thus, the plan envisages (1) the installation of wood preservation and bamboo pressurisation plants with standardised equipment, (2) timber engineering factories with a uniform code of design and practice, (3) a Central College of Timber Engineering and Wood and Bamboo Preservation for the training of civil engineers, and (4) an Asian Regional Institute to work in liaison with the Central College of Timber Engineering as above for the standardisation of related designs and structures.

CEMENT PRODUCTION IN INDIA

Plans for increasing the production of cement in India have been stated to be under way and the Indian cement industry is expected to hit a new level of production this year. Production of cement during the year 1948 was estimated at 17,63,745 tons, which is only about 74 per cent. of the rated capacity of all the producing units, namely, some 24,15,000 tons. This output is proposed to be increased with the addition of new units to nearly 31,25,000 tons during the current year. Already six units with an aggregate capacity of 5,30,000 tons are stated to be in the process of erection and these are expected to go into production shortly, while erection work on seven more units with a capacity of 7,20,000 tons is expected to be completed by 1951.

Refining of Petroleum with Bauxite

IT has been known for many years that Fuller's earth is capable of exercising a selective action on petroleum by retaining the unsaturated hydrocarbon and sulphur compounds which are present in mineral oil. This remarkable property was utilised in oil refineries in the U.S.A. and other countries, and the theoretical aspects of the phenomenon have been ably discussed in numerous scientific journals. Investigation has shown that colloids such as alumina, bauxite, Fuller's earth etc. when freshly ignited (about 500.C), acquire the curious property of activity attaching to themselves (on their surfaces), by absorption, other colloids and certain reactive substances, colouring matter and sulphur compounds in particular being readily absorbed when kerosene is filtered through freshly treated bauxite.

This discoloration and desulphurisation of mineral oil by Fuller's earth, bauxite, etc., is said to be produced by physico-chemical action relating to surface tension. No reagent is necessary, and no chemical inter-action results, although a slight rise of temperature has been noticed. Kerosene which was filtered through graded bauxite 30 to 60 mesh became water clear and, for practical purposes, free of sulphur. In process of time the bauxite in a filter becomes less active, but it can be rendered effective again by reheating. Thus it appears that, except for handling for reheating and sieving, there would be no loss of the bauxite, which can be used over and over again. Bauxite filters are now being installed in all modern oil refineries for the purification of kerosene oil. According to A.E. Dunstan, Messrs. Hall Motor Fuel Coy. Ltd. have in recent years carried out this process in a slightly different way. They pass the vapour of petroleum over heated bauxite, and have demonstrated a very important point. This is that "cracked" spirit, a most difficult substance to refine, is capable of simple and easy refining without any chemical treatment at all, and with the minimum of loss.

Considerable attention has been attracted to the fact that all kinds of bauxites are not equally efficient in the purification of kerosene oil. Also, much experimental work is in progress to discover why the most efficient kind of bauxite for kerosene oil purification is not equally effective in desulphurising petrol, and the reason of its failure when used for the purification of lubricating oil. Very little information is available regarding the results obtained in the recent investigations regarding the use of bauxite for the desulphurisation, etc., of all the petroleum distillates from light spirit to the stiff wax. In most cases this research work is being conducted in the chemical laboratories of oil refineries.

Certain Indian bauxites, if partially calcined, have the property of removing those sulphur compounds, etc., which impair the colour, odour, etc. of kerosene. The Burma Oil Company have used bauxite for this purpose since 1908. This selective absorption of these undesirable impurities is thought to be similar in action to the familiar property of bone or wood charcoal for decolorising sugar solution, and the deodorising and clarifying power of Fuller's earth, aluminium hydroxide, Floridin, etc. with regard to certain other liquids. Owing to the fact that Indian bauxite, which contains on an average 24 per cent. combined water, is more effective in this respect than French bauxite, which averages less than 12 per cent. of combined water, the opinion is that the action is dependent on surface ten-

sion phenomenon. In either case the raw material is unsuitable, and should be heated or steamed to a temperature of about 400°C. The porosity of the partially calcined Indian bauxite being greater than that of the French material, the Indian bauxite is more efficient for the removal of colour and sulphur derivatives from kerosene.

This is well seen in the following table, which shows the percentage of moisture removable by roasting at 400°C, the ergometer rise (maximum) and the amount of total sulphur removed, all expressed in proportion with the worst sample of bauxite as unity. Direct proproportionality is seen to exist between these three sets of observations. The colour of the filtrate improves progressively with the activity of the bauxite, but the exact relationship between the two has not yet been ascertained.

Bauxite	Water removed at 400 C.	Ergometer Rise	Sulphur Removed	Colour of Filtrate, Degrees (say bolt)
A	1	1	1	18
B	1.1	1.3	1	18.5
C	1.4	1.4	1.5	19
D	1.9	2	2	24
E	2.94	3	3	24
F	2.9	3.3	3	24
G	4.35	4.6	4	25
H	4.42	4.8	5	25
I	4.72	5.5	5	25

It is presumed that A is typical French bauxite (averaging 14 per cent. water, of which probably 3 to 5 per cent. is given off by roasting to 400°C) with an ergometer reading of 8°C rise in temperature in contact with kerosene. E would appear to be on Indian bauxite (with about 22 per cent. water of which 4 to 6 per cent. is given off by roasting to 400°C) giving an ergometer rise of 23 to 28°C; H is evidently Indian bauxite (containing 30 per cent. water of which 6 to 8 per cent. is given off by roasting to 400°C) having an ergometer rise of 41°C.

It has been stated that the temperature to which calcination is conducted greatly affects the activity of the bauxite. Below 400°C the activity is weak, and above 700°C the activity is seriously reduced. Also calcined bauxite, if not used for some time, is found to have become less active, but this can be remedied by warming it up to 200°C. The temperature at which filtration is carried out is of importance if desulphurisation and decolorisation are both to be effected in one operation. This is well shown in the following table:—

FILTRATE

Temperature of filtration	Colour, 18 inch. cell (levi bored) Yellow	Red	Sulphur per cent.
10°C	1.5	0.40	0.091
20°C	2.2	0.09	0.087
30°C	2.9	0.10	0.085
40°C	4.0	0.58	0.084
50°C	6.0	0.70	0.080
60°C	6.9	0.60	0.077
70°C	7.4	0.50	0.075
80°C	8.0	0.90	0.072
90°C	9.6	0.70	0.068
100°C	10.4	1.0	0.065

This shows that the sulphur is best removed at warmer temperatures while the colour darkens with increased heating. It is thought that this colour effect is due to a polymerising effect of hot bauxite.

The subject of the use of bauxite for petroleum refining has been investigated by the Research Department of the Anglo-Persian Oil Company. Their work leads them to the opinion that:—

(1) Material such as roasted bauxite containing large numbers of microscopic pores, is well known to possess an enormous surface area and consequent surface energy.

(2) When oil is allowed to come in contact with freshly ignited bauxite a considerable rise in temperature is observed, due to the surface energy being converted into heat energy.

(3) Bauxite wheys Freundlich's rule which may be summarised as follows:—

(x/m) is proportional to C, where X =per cent. of total sulphur absorbed by bauxite per 100 parts of kerosene, C= per cent. of sulphur in kerosene before filtration, n=a constant.

They state also that:—

(1) Bauxite is a colloidal absorbent of the first order for organic sulphur derivatives.

(2) Freshness of preparation gives best results; i.e. ignition immediately before use.

(3) Bauxite per X is a complete and sufficient refining agent for kerosene.

This is seen in the following normal cases:—

Initial colour	Final colour	Per cent. of colour removed	x/m.
100	52	48	9.6
58	32	45	5.2
42	21	50	4.2
14.2	5.5	61	1.74
4.6	2.2	52	0.45
3.5	1.7	52	0.34
1.7	0.8	53	0.17

(4) Other sulphurous distillates are also capable of purification by this process, as shown in the following bath:—

Material Tested.	Ergometer Rise, Oc.
Crude untreated kerosene	15.7
Kerosene refined by hypochlorites	16.4
B. P. No. 1 petrol	15.8
Shell aviation spirit	15.6
Benzol	18.2
Xylol	17.2
Amylene	13.8
Medicinal liquid paraffin	6.0

The present method of using bauxite may be divided into the following stages:—

(1) Filtration — A predetermined volume of oil is filtered through a definite weight of bauxite.

(2) Steaming out—The filter is st med out until no further kerosene can removed economically.

(3) Make up—Fresh bauxite grou to size, and the required quantity adc to make-up for losses in working.

(4) Roasting—The fresh made bauxite and the spent material are roas in excess of air to remove moisture, last trace of kerosene, and firmly reta ed organic matter and carbon, thus free the pores for a new run.

The rate of filtration is of less imp tance in the removal of the sulphur th it is for decolorising. A slower is bet for the latter. The size of the partic is also important, as seen below:—

Mesh of Bauxite.		Ergometer R
Held on 10		7.5 per c
,,	10-20	9.1 ,,
,,	20-30	13.4 ,,
,,	30-40	15.7 ,,
,,	40-60	15.3 ,,
,,	60-70	15.6 ,,
,,	70-90	15.6 ,,
Passing	90	12 ,,

A recent development has been es blished by O'Brien. The ground bauxite charged into the container, and th heated by means of super-heated steam a temperature not lower than 350°C a which it is cooled by passing dried through it. The liquid to be refined thus passed through the filter, the quan ty having been previously determin The bauxite charge is afterwards subje ed to steam, aided by the vacuum pu and when fully drained is again trea with superheated steam at a temperat of 350°C for regeneration, as previou stated. These operations are carried alternately.

However, there is little doubt that enormous saving in purification costs t might be effected by the successful ap

cation of bauxite for all the petroleum distillates is an incentive to further investigation. Until a bauxite is actually tested, it appears difficult to say how efficient it may prove for the purification of kerosene. The chemical analysis gives practically no clue to the value of the bauxite for this purpose. So far, the Indian high combined-water type of bauxite appears to have proved most suitable, and it is thought that this is due to the micro-cellular structure which must result when this bauxite is ignited preparatory to its use in the kerosene filter.

The demand for bauxite for oil purification becomes larger year by year, and would be very considerable if bauxite was, by suitable thermol treatment, made capable of purifying all petroleum distillates as efficiently as it treats kerosene. The waste, chiefly as dust, in crushing, heating, sieving, retreating, etc., although not large at first, steadily accumulates, so that perhaps some economy could be effected by collecting the dust and marketing it as bauxite dross.

MANUFACTURE OF SOAP BY DRY SAPONIFICATION

DURING recent years much effort has been expended in attempting to develop saponification methods which cut the time in soap manufacture. Advantages of reducing manufacturing time are several, mainly a reduction in equipment required through releasing equipment quickly for additional batches. Various methods of rapid saponifications are designed for the manufacture of soap in a few hours as compared with 4 to 6 days required by the usual full-boiling process. A number of rapid saponification methods are being used with success to-day. However, the saving in time is in some cases made at the expense of quality, loss of glycerine, and higher cost factors.

In this article it is proposed to descri one type of rapid saponification design to eliminate the time-consuming proce of kettle boiling is the saponification fats or fatty acids in a practically anh drous state. Instead of using a wat solution of caustic soda or sodium ca bonate, the alkali in the dry process intimately mixed with the fatty materi in a powdered dry state. The reaction extremely rapid and gives a soap whi is anhydrous for all practical purpose Quite some work along this line has bee carried out in Germany and the proce is reported to have had successful com mercial application there.

The process is based on the fact th when the molten fatty acids are intimatel mixed at the approximate liquefying ten perature of the fatty acid with a smoot homogeneous mass free from lumps, an after a short time, this highly concentrat ed soap-mass, becomes completely sapon fied through its own oxo-thermic reactio If the proper amount of soda which necessary for saponification be not ex ceeded, the reaction carries out in suc manner that quantitatively resultar water-free sodium soap and bicarbonat are formed.

The soap is finished when a sampl shows no free fatty acids on being sub jected to the usual ether test. The tim ordinarily required is from 15 minutes t 1 hour depending on the type and charac ter of fat used. This anhydrous soap pro duct, containing only bicarbonate of sod in excess, has especially interestin advantages over other soaps for the pur pose of compounding bleaching soa powders containing oxygen liberatin salts such as sodium perborate. In suc cases, it is necessary only to add th required amount of percarbonate, per borate, or other oxygen bearing sal which may be desirable, and a mixture i

obtained free from the usual deficiencies of most soaps containing moisture.

Soap made in accordance with the Welter method (i.e. German Process), may be converted strictly into a flake soap running through steel rolls, whereby thin translucent flakes are produced free from moisture, eliminating drying in the usual way.

Powdered soaps are reported produced with equal facility and if it is desired to manufacture this type of material, the concentrated soap mass is permitted to cool out and then run immediately through suitable grinding equipment. Since the soap mass cools very speedily and also acquires a brittle hardness, the powdering is done easily and one may regulate the size of the grain to any degree of fineness desired by the adjustment of the screening mesh. Light weight grains of soap or finely powdered soaps are produced by this arrangement quickly and may be packed or barreled at once directly from the powdering machinery.

When other types of soap are required, it is possible to make such changes in raw materials as may be desired, depending however, on adherence to the Welter principle that is, the use of the proper quantity of soda ash proportionately to the quantity of fatty acids. In other words, it is possible to substitute a part of soda by potash, and also to replace some fatty acids by rosin. It is possible in incorporate solvents like benzine, naptha, pinen oil, carbon-tetrachloride, etc. and when such additions are made to the fatty acids, the process is carried on with equal facility and in some cases the reaction is improved. The soaps containing the solvents are quite stable and process enhances detergent and washing properties.

In the use of oxidisable fat stocks, special case has to be taken that the reaction during the mixing process does proceed too rapidly. When the weig of the raw-material admixtures are ca fully guarded, and the additions carefu controlled so that the same are appl only in proportion to cooling surf capacity while the mixing apparatus is operation. Too much heat will not evolved and there will be no danger carbonizing the stocks. The lower temperature at which the fatty acids worked, the more uniform will be the sultant mixtures. The lower also is t percentage of carbonic acid developed the reaction mass, so that only fatty aci of the sodium salts and bicarbonate a formed. Usually too, the finer the powd and moisture freedom of the carbona which is used, the better and easier t process functions. A few typical exan ples of the process are given as follows:

1000 kilograms of oleic acid are ru into a vessel provided with a stirri mechanism at a temperature of 30° 50°C and 200 to 250 kilograms of we ground calcined soda are added, wherel an entirely homogeneous thin pulp obtained. When after a short stirring, tl latter has become sufficiently viscous that it will not separate, the reaction ma is allowed to deposit on sheets of ir which are placed in drying chamers. Tl soapy pulp becomes puffed up during tl next few hours owing to the formation carbonic acid and produces a har porous, homogeneous soapy mass. Th mass can be easily pulverised and di solves easily. If only one molecule water-free soda is used for two molecul of fatty acids, then when it is worked small quantities a subsequent heating drying chambers is necessary under ce tain circumstances for driving off tl carbonic acid. In all cases, howeve where a small excess of soda, is presen and when one molecule of soda is use for one molecule of fatty acid, sufficie

heat is generated by the formation of bicarbonate so that complete saponification takes place in a short time.

1000 kgs. of palm fatty acids are added in a steady stream at a temperature of 35°C into a mixing drum having a stirring mechanism, in which 450 to 500 kgs. of calcined soda have been previously introduced. A thin pulp is then obtained which becomes heated by the saponification which takes place, and becomes thicker and can finally be removed from the mixing vessel as an entirely homogeneous, hard friable mass. On the following day, the reaction mass which has been formed is so hard and brittle that it can be easily ground, does not feel fatty to the touch, and consists only of a mixture of soap and bicarbonate, which forms a clear solution with water.

1000 kgs. of cotton oil fatty acid are mixed in a mixing drum having a strong stirring soda at about 30° to 35°C. When the mass has become like a pulp and does not stick any longer, it is pressed by a screw lying at the bottom of the mixing vessel into an extrusion press and shaped either hydraulically or mechanically into extrusion of any suitable diameter. These after a short time, by the complete saponification which takes place, become hard and brittle, have a good appearance and a long duration.

In the process, it is possible by using suitable apparatus to manufacture soaps in a continuous manner. The mode of working from the moment of the introduction of the fluid fatty acids until the outlet of the hard, saponified, saleable product, requires according to the temperature and to the kind of fatty acid, for a quarter of an hour to an hour.

1000 kgs. of coconut oil are stirred together with 600 kgs. of calcined soda which contains 20 per cent. of water and is ground very finely into a mixing drum, whereby after a certain time the mass hardens into a dough, becomes warm afterwards and then becomes completely saponified. When the mass does not stick any longer, it is shaped by means of an extrusion press into noodles or is ground after cooling and pressed into cakes. The cakes which are so obtained do not contain any more soda, but only bicarbonate and a little water.

1000 kgs. of cotton seed fatty acid are mixed with 50 kgs. of turpentine oil, whereupon this mixture is mixed in a mixing drum having a strong stirring mechanism with 400 kgs. of dried calcined soda at approximately 30°C.

When the mass has become like a dough, it is pressed by a screw lying at the bottom of the mixing vessel into an extrusion press, and shaped either hydraulically or mechanically into extrusions of any suitable diameter. These become hard and brittle in a short time, owing to the complete saponification that takes place, and have a good appearance. It is possible to allow the mass to cool, to grind it into a fine powder, and if necessary to press it into cakes.

DEVELOPMENTS IN VEGETABLE OIL EXTRACTION

DURING the past 25 years, the vegetable oil extraction industry has undergone a considerable change with respect to processes, equipment and practices. As a result, the industry has now changed over from pressure extraction with expellers or hydraulic presses giving a comparatively low yield of oil, to processes based on advanced knowledge of chemical engineering principles yielding higher percentages of oil. This transition has been, for the most part, from an industry requiring a very modest capital investment in simple equipment to an industry represent-

ing a substantial investment in complicated chemical engineering equipment and auxiliary processes. Consequently, this higher yield of oil obtained from seeds or pressed cakes leaves the meal with a higher percentage of protein concentrate which provides higher nutritional value from the point of view of cattle feed. Moreover, the meal produced can be used with complete satisfaction for human consumption.

Soya-bean or for that matter, any oil seed with an original oil content of less than 30 per cent. is seldom pressed by mechanical expellers in America or on the Continent. For seeds with an oil content exceeding 30 per cent., such as groundnut, a combination of expeller-solvent extraction operation is recommended. Most of the earlier installations in Europe and the United States adopted this process for extracting oil from soya-beans, for this was a comparatively low oil-bearing seed with 20-22 per cent. oil content, and mechanical extraction was expensive, as the oil content in the residual cakes could not be reduced to less than 4-5-5 per cent. The solvent extraction process, on the other hand, yielded a cake containing only 0.5-1 per cent. oil. Later installations have demonstrated the benefits of solvent extraction of oils from pressed cakes obtained by expellers from groundnut which contain 8-10 per cent. of residual oil, and there were several mills operating in Germany employing expeller cum solvent extraction processes before the war.

PROCESS

The raw materials, whether they be nuts, beans or pressed cakes, with an oil content not exceeding 30 per cent., are treated in the preparatory milling equipment, converting them into flakes of suitable size and thickness with mosture regulated to 12 per cent. and temperature lower than the lower boiling limit of th solvent. The flaked material then enter the extractors where it contacts the sol vent, and oil is removed by washing an diffusion. The mixture of oil and solver termed "miscella" is clarified by filtratio and, subsequently, by centrifuging. Th mixture is then distilled to remove th major part of the solvent, and finall stripped in rectifying columns to remov the last traces of moisture and solven The solvent-free oil is drawn off the bas of the tripping column and pumped t storage tanks. The solvent vapour fro the evaporator and distilling columns condensed and water removed by decar tation before returning the solvent to th extractor. The solid residue from th bottom of the extractor enters drye where the last traces of solvent are drive off by heat and condensed. The solven free meal is conditioned by toastin followed by cooling, sifting and baggin in the warehouse.

EQUIPMENT

A solvent extraction plant consis mainly of the extraction apparatus, eva porator units, distilling and rectifyin columns, "miscella" storage tanks, filter meal dryers and accessories. The Ande son extraction plant discussed here is American design. It has an extractio column embodying the patented settlin chamber device for "miscella" fines and discharge device which is a modificatio of Anderson's expeller application. Th settling chamber device consists of number of vertical tubes through whic the "miscella" flows. A disc in whic there is a triangular opening covers th top of the tube permitting the intermitte discharge of "miscella" from each tub as the disc revolves. While the "miscella in each tube is stationary, the fines settl into the lower part passing out throug

the bottom of the column with the flakes of the material.

One of the latest of the continuous solvent extraction plant is now operating near Wooster. Ohio, U.S.A. The plant does not require any elaborate factory installation. It is placed in the open with no building of any sort, thus eliminating explosion hazard inherent in housed equipment, especially when hexane is used as a solvent. The extraction unit is located 50 ft. away from the preparation building. It is thoroughly insulated and weather-proofed. The equipment is largely pre-assembled and compact, different pieces of the unit supporting one another so that no special building or frame-work is needed except for a concrete footing and foundation slab.

REMOTE CONTROL

The outdoor extraction unit is remotely controlled from a room in the preparation department by one operator. Push-bottom station, complete with pilot lights for all equipment, are grouped in accordance with the operating sequence. All principal equipment of the extraction unit are electrically interlocked. It is, therefore necessary to start the plant in proper sequence and interruption to any unit shuts down equipment ahead of it. The grouping of all instruments at one location gives the operator very close control and allows finer co-ordination of the entire operation.

The vapour scrubbing device located between the main condensers and the solvent recovery dryers afford protection to the main condenser by separating dust that might come off with the vapour from the solvent recovery dryers which, if allowed to enter the condenser unit, affect the efficiency of the condensers, thus increasing the solvent loss. The equipment is designed with two main condensers, each having a sufficient capacity to take care of the entire plant in case any cleaning operation should ever be necessary while the extraction unit is in operation. The evaporator, vaporizing chamber and stripping column are built in one column with the further advantage of using waste heat from one element as the heat source for the other saving in steam, piping and insulation. This solvent extraction unit is elegant in design, practically trouble-free, and requires less labour and space.

SOLVENTS

The selection of the most suitable solvent depends on the following considerations:

The solvent desirable for vegetable oil extraction should take up the oil selectively and dissolve a minimum quantity of wax, resin and colour: otherwise this may result in a dark crude oil involving high refining costs. The solvent should be low boiling with a narrow boiling range and chemically inert, leaving no odorous residue. Among the solvents now in use are alcohol, carbondisulphide, chloroform, ethyl ether, methyl chloride, acetone, benzene and petroleum ether. In Europe, the common, solvent recommended by the manufacturers of equipment is benzene, b.p. 70°-90°C. This has an aromatic flavour and, in order that no aromatic smell is present in the products, the meal is de-aerated in the process. In the United States, where the continuous system is followed, the solvent recommended is normal hexane, b.p. 62°-65°C. Both the solvents have good selectivity, excellent stability and low evaporation residue, but they are inflammable. The Japanese have reported the use of alcohol as a solvent for the batch extraction of soya-beans in a plant at Darien,

Manchuria. They have published data on the miscibility of soya-bean oil in various ethanol water ratios. The data shows that absolute alcohol (99.52 per cent.) is miscible in all proportions with soya-bean oil above 67.3°C. At the lower alcohol concentration, 95.92 per cent., the oil solubility is greatly reduced, and complete miscibility is not attained even at the boling point, 78°C. However, the solvent proportion of 95 per cent. alcohol may be brought into a practical solvent range by operating under sufficient pressure to bring the temperature to 90°C.; obviously, the separation of the miscella from the oil-bearing material must also be carried out under pressure. Both 95 per cent. alcohol and absolute alcohol remove water from oil-bearing meal at the moisture content usually employed in solvent extraction, and quickly becomes diluted to such an extent as to be of no further use as an oil solvent unless rectification and dehydration be used to remove the water. To minimize the dilution of alcohol, the Japanese recommended that the moisture content of the oil-bearing material be reduced. In fact, under the ordinary conditions of drying, the moisture content of soya-beans is often reduced below 3 per cent. and an actual improvement takes place in the efficiency of alcohol as an oil solvent.

SOLVENT LOSS IN TROPICAL CLIMATES

Solvent loss is the chief consideration in all solvent extraction units. Various equipment manufacturers have adopted variations in design in order to see that the solvent loss is kept within a reasonable limit. In all the designs the local considerations as to air temperatures, humidity and temperature of cooling water available, physical condition of raw material while entering the extractors have been given careful consideration. The average summer temperature of cooling water available in this country is about 90°F., while the temperature of water on the Continent and in the United States is only 65°F. To cool the temperature of water from 90°F. to 65°F. requires a big refrigeration unit, which means the process is uneconomical. For this the condenser should be designed for a high flow rate of cooling water; if the solvent loss turns out to be high, the vent gases can be directly led into a dephlegmator unit where it can be cooled by a small refrigeration unit and condensing the solvent vapour sufficiently well below the vapour dew point.

COST ESTIMATES PER 24-HOURS DAY BASIS FOR SOLVENT EXTRACTION OF GROUNDNUT PRESSED CAKES.

	Rs.
Raw Materials:	
50 tons oil cake of approx. 10% oil content at Rs. 130/- per ton	6,500
Utilities:	
(a) 70,000 lb. process steam at 140 lb. per sq. in. corresponding to 4.6 tons coal at Rs. 30/- per ton	138
(b) 13,750 gal. make-up water requirement, i.e. 5% of the total water circulated at Re. 1/- per 1,000 gal. ...	14
(c) 1,500 kwh.electricity at ½ anna per unit	47
(d) Solvent haxane based at 1% loss equivalent to 120 gal. per day (Price Rs. 3/- per gal.)	360
Labour & Supervision:	
1. Technical manager Rs. 900/- per month .. .	
2. Solvent plant operators Rs. 1,050/- per month	
3. Assistant solvent plant operators Rs. 600/- per month	
8. Mechanical engineers Rs. 900/- per month	
3. Asst. mech. engineers Rs. 450/- per month	
3. Boiler engineers Rs. 600/- per month	
6. Preparatory plant tenders Rs. 600/- per month	
Depreciation at 10% on Rs. 10,00,000 per year	385
Total per day Rs.	7,579

Credit for Sale Proceeds

4 Tons of oil based at 8% recovery ..... and selling at Rs. 1,125/- per ton	4,500
46 tons oil cake at Rs. 100/- per ton	4,600

Profit per day Rs. 1,521/- (45% over investment) ....

Reference

1. Beekel, A.C.: J. Amer. Oil Chemists Soc., 1948, 25,7 .. ..

By M. N. KRISHNAMURTI,

In JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH.

ALUMINISING OF METALS BY SPRAYING

IT has been known for a long time that most alloys rich in aluminium are resistant to oxidation at high temperatures. This is due to the facts that on such alloys a film of aluminium oxide is formed which, though usually very thin is highly impervious and refractory. Furthermore, this film has the property of being self-heating, that is to say, if the skin is broken further oxidation quickly occurs, and a fresh covering is formed which stifles further action.

There are various methods of making use of this property, and one well-known process is that of colorising. This is a cementation process, the principle being that the articles to be treated are cleaned and packed in a drum with aluminium powder containing certain additions. The drum is then heated to a fairly high temperature. The aluminium is absorbed into the surface of the article, giving an alloy layer the thickness of which depends largely on the time and temperature of treatment. The process is very satisfactory, but suffers in that it is difficult to treat very large articles conveniently, there is some danger of distortion, and the process is inclined to be rather costly.

Another process is that of immersing the articles in a bath of molten aluminium, but this has the disadvantage of causing distortion and gives somewhat uneven results.

Metal spraying offers a convenient method of covering the surface with aluminium, and early workers in the field naturally tried to adopt the process to the prevention of high temperature oxidation. It was quickly found, however, that aluminium as sprayed, could only be relied upon to give protection at temperatures not exceeding 470°C. Above this temperature protection rapidly deteriorates and the aluminium layer becomes oxidised very quickly, forming a white chalky deposit of aluminium oxide, quite different in character from the thin protective film Before the melting point of aluminium is reached, most of the aluminium deposit oxidised and very little absorption of aluminium could, therefore, take place; any absorption that did exist is extremely patch. The problem, therefore, is to find a method by which the aluminium layer is not oxidised to any great extent before alloying took place.

SILICATE METHOD

The first commercial aluminising treatment is that used in Germany and quite simple in operation. The parts to be treated are sprayed in the usual way with a thickness of between 6 to 10 mm of aluminium, and are then covered with a solution of sodium silicate. The solution is made by diluting ordinary silicate just sufficiently to allow it to be brushed on easily. The parts so treated are then placed in a furnace and raised as quickly as possible to a temperature of 700° to 800°C. The silicate fuses and forms a protective skin under which the aluminium can alloy with the base and so form a protective layers of aluminium alloy. The objection to this process is that the parts treated are often covered with a glossy brown slag which detracted from their appearance; and in subsequent service the slag is opt to become fused and sticky, contaminating the article in the furnace. This method of using a siliceous sealing compound is still in use in Europe and America.

It is claimed by some that this general method allows of spraying and painting with the sealing compound and putting the parts straight into service. If the service conditions are such that the surface gets hot quickly, success may be achieved, bu in the case of large articles which can only heat up slowly, bad results are often obtained because the sealing compound is not entirely effective in preventing the access of air to the aluminium layer before alloying takes place.

BITUMASTIC METHOD

In this process the articles are sprayed to a thickness of 8 mils. and are then painted with bitumastic paint. It does not matter if this treatment is not carried out for some hours. The composition of the paint is not critical. Black bitumastic paint has been used extensively as it is an extremely easy substance to apply and is obtainable without difficulty at comparatively low cost. If the articles are large and tend to heat up somewhat slowly, it is an advantage to mix one pound of dehydrated borax powder with each gallon of bitumastic paint, but this is by no means essential.

In commercial work the painted parts are placed in a furnace and raised as quickly as possible to a temperature of 800°C. When the surface has been at this temperature for 10 minutes to 30 minutes according to the nature of the metal, the parts are removed and allowed to air cool. The disadvantages of the process is that a certain art has to be acquired in order to prevent distortion, and for this and other reasons the aluminising furnaces are controlled pyrometrically, being fitted with automatic temperature control

ALLOY PROCESS

The alloy process of aluminising has been developed successfully and patented. The aluminium wire used in this method contains a small proportion of another metal, usually cadmium (0.75 per cent). This small proportion of easily oxidised metal functions as a deoxidiser and also reduces the surface tension during the melting period. When a metal alloy is used, the process is similar except that no paint is required and the atmosphere of the furnace must be slightly oxidising. The process is arranged so that no trace of the alloying metal is left on the surface after treatment.

NATURE OF ALUMINISED SURFACES

The appearance of an aluminised surface is somewhat dull and grey in colour except that in the case of a siliceous seal some slag may be retained. The colour of the aluminised coating is not uniform, but this is because the surface which is seen after heat treatment is not the actual alloy layer which has the protective properties but an excess of aluminium heavily oxidised. It is found that some of the aluminium in the sprayed layer is not absorbed, with the result that the top layer is largely composed of aluminium oxide. This layer is modified in colours by the presence of the aluminium metal and the stains due to furnace treatment.

It should be mentioned that if the original coating is more than 8 mils. in thickness, there is a certain amount of aluminium which is not absorbed but which becomes contaminated with the base metal to form a layer of aluminium rich alloy. These alloys usually have a very widely different coefficient of contraction from the base-metal, and, in cooling, such layers tend to crack and give the appearance of a crocodile skin. This is an indication of too heavy an aluminium coating. On the other hand, if the original coating is too thin, the appearance after heat treatment is very dark and may be almost black and extremely powdery. These difficulties

are, of course, overcome by checking the original coating for thickness.

The aluminising treatment is usually applied to steel, but under certain conditions it may be applied to cast-iron, copper, or nickel-chromium alloys. In the case of steel, the treatment is effective only to a temperature of 950°C. For temperatures exceeding this, the rate of absorption of the aluminium into the steel base becomes so great that the amount of aluminium on the surface becomes too small to give the protection which is necessary. The presence of small quantities of zinc in the aluminium used, or of zinc dust on the surface before furnace treatment will cause failure of the process.

ALUMINISING COPPER ALLOYS

Copper alloys may be aluminised unless they contain zinc. The top surface is usually grey and shows evidence of the crocodile-skin effect. If this layer is removed by scratch-brushing, a golden surface is exposed which has good properties of protection. The diffusion into the copper is very much more rapid, and the working temperature should not be above 650°C. It is necessary to point out that copper-aluminium alloys have a very poor heat conductivity, although both the original metals are good conductors of heat. The property prevents the use of aluminising for such articles as single plates. The copper-aluminium alloys are also somewhat brittle, and aluminised copper tube cannot be easily expanded into tube plates.

It may seem strange that aluminising is also used on the heat-resisting nickel-chromium alloys, but in this case the object is not to give further heat-resistance, but to prevent the attack of sulphurous gases which are fatal to nickel alloys. A point that should be remembered also is that aluminising does not prevent distortion, and articles that are to withstand heat for a long time must be designed to reduce distortion as far as possible.

ALUMINISING CAST-IRON

A special word is advisable on the aluminising process when applied to cast-iron. Grey cast-iron contains many impurities, also contains free graphite. Free graphite tends to prevent the absorption of aluminium so that the treatment of cast-iron is more difficult than aluminising of steel. Even when cast-iron is successfully processed, the penetration of oxygen at high temperatures causes oxidation within the structure of the metal itself, and most irons tend to get larger in surface area. As the iron increases in volume underneath the skin, there comes a time when the skin will not stretch any further and the aluminised layer cracks. It is therefore important that if cast-iron is to be aluminised it should be of a quality which is not subject to excessive growth; and it is advisable that the silicon content be as low as possible.

SAVING MACHINERY FROM RUST.

THE destruction of metals by corrosion is among the most serious problems the engineer has to face. Every year damage costing tens of millions of pounds is done to metalwork of every kind.

Buried iron pipelines, for example, are eaten away by the activities of sulphur-producing bacteria present in certain types of soil. Salt water ceaselessly attacks hulls of ships, piers, bridges and other marine works. Damp is liable to cause rust and damage in almost every kind of machinery, especially if it is temporarily out of use. Even in properly built stores, where temperature and humidity can be controlled, unprotected metalwork is liable to attack.

It is, therefore, not surprising that the development of substances which will prevent corrosion has long engaged the attention of chemists. The galvanizing of iron and the development of highly resistant paints are two well-known examples of the methods which have a wide but far from universal application. Recently, attention has been directed to a substance whose use has been developed in the chemical laboratories of Britain's Department of Scientific and Industrial Research and which has had a remarkable success in preventing the ordinary processes of corrosion in metals.

WARTIME EXPERIMENTS

This substance is sodium benzoate. It is new only in the sense of being used to prevent corrosion, having been well known to chemists a great many years, and is used in a small way for processing tobacco, preserving food, making dyes and other purposes.

Its new role dates from the last war when experiments were being made on anti-freeze solutions for radiators of motor vehicles. It was found that sodium benzoate was an excellent anti-freeze, except that it had the tendency to form a thick white deposit at points in the cooling system. Observant engineers noticed that when a little of one of the conventional anti-freezing compounds, glycerol or glycol, was also present in the radiator this deposit was absent. The radiator, cylinder-jacket, pipes and pump remained clean and undamaged far longer than would normally be the case.

Closer examination showed that sodium benzoate had other excellent properties which made it worth while to carry out detailed investigations of its possibilities as an anti-corrosion agent. For example, it was quickly shown to be a "safe" inhibitor. That is to say it is harmless even if the quantity of sodium benzoate is less than that required to prevent corrosion. Some inhibitors are harmful under such conditions, reversing their normal beneficient action and actively attacking metal instead.

Equally useful is the fact that it discourages the growth of moulds and bacteria, a property which is responsible for its use as a food preservative. Under hot, damp, tropical conditions, the destruction by moulds can become exceedingly serious and expensive as was learned by bitter experience during the war in the Pacific.

DOUBLE PROTECTION

At first experiments were made to incorporate sodium benzoate in a variety of transparent wrappings made from cellulose but a much more promising development has been made recently as a result of collaboration with Britain's Rubber Producers' Research Association. This has led to the making of rubber latex impregnated with sodium benzoate. This material has a double protective action. It excludes damp air and corrosive vapour and at the same time the presence of benzoate reinforces the normal action of the wrapping and replaces it if the wrapping becomes broken.

The benzoate latex can be used in two ways. Small objects can be immersed in it completely and the surplus drained off. Larger articles can be sprayed with it. In either case, the latex quickly dries to a thin but tough coating which completely covers the object to be preserved. This coating does not adhere to metal and can easily be stripped off later when the article is required for use. To make stripping easier, tapes can be incorporated in the latex and then all that is necessary is to rip these away.

WIDE APPLICATION

Although the latex film alone has considerable powers of protection, these do not compare with those of the benzoate and latex together. After long exposure to conditions far more severe than would normally occur, the metal surface under the special film remains bright and untarnished. If no benzoate is used, however, rusting soon begins under the same conditions. If necessary, air emulsion containing synthetic rubber can be used in the place of natural rubber latex.

This new method of preserving metalwork is expected to find a wide application especially in the protection of machined metal parts which have to be stored under poor conditions or during transport. It may, for example, relieve pressure on shipping by allowing certain kinds of machinery to travel as dock cargo.

—By DR. TREVOR J. WILLIAMS
Bitish Information Services.

VICARA—A NEW TEXTILE FIBRE

IN 1939 Virginia-Carolina Chemical Corporation began investigating high polymers from protein bases. Many proteins were experimented with,—peanut, casein, soybean, cottonseed, zein—and zein was regarded as the most adaptable in fibre making. Development of the product has gone from the laboratory stage to a small pilot plant scale, to a large pilot plant, and finally to the ultimate goal of production plant in Taftville, Conn.

Zein is one of the proteins of corn. The production of zein in the United States is potentially unlimited in quantity.

MANUFACTURING PROCESS

In the manufacturing process, the protein is first dissolved in an alkaline solution. This spin solution is extruded through spinnerettes into an acid-precipitating bath for coagulation, stretched, and cured in a series of hardening baths and treatments. The resulting tow contains 270,000 filaments. This is a brief description of the complicated process of manufacturing Vicara, but from the initial protein to the finished fibre many miles are travelled and many hours consumed. Throughout the entire operation, thorough and rigid controls are maintained to insure complete uniformity of the fibre.

Vicara is not offered as a substitute for any of the fibres now in commercial use, either natural or man-made. Because of its protein base, it is more like wool than any of the other fibres; however, it is not a synthetic wool. It is an individual fibre with distinctive properties. It can be made as 100 per cent. yarn and fabric but best results have been obtained in blends. It is the opinion of the producers that Vicara adds suppleness to rayon, a down-like texture to wool, and absorptiveness and warmth to nylon.

PHYSICAL PROPERTIES

Vicara has a soft; resilient handle and in its natural state, is light golden in colour.

The tensile strength is adequate for all textile operations—I gram per denier dry and 0.5 gram per denier wet. The elongation is about 42 per cent. dry and 50 per cent. wet. The ratio of knot and loop strength to straight strength is good. The elastic recovery is 100 per cent. at a 2 per cent. elongation and 98 per cent. at a 5 per cent. elongation. The specific gravity is 1.25. The commercial moisture regain is 13 per cent. at standard conditions, the moisture absorption is 18 per cent., and the moisture retention is

36 per cent. The burning rate of Vicara is slow, slightly faster than wool. Vicara is not thermoplastic. It has excellent heat resistance up to 302°F. for long periods. It melts at 525°F. The warmth properties are claimed to be very good. The fibre is inherently moth resistant.

Highly resistant to mildew, a Vicara fabric which was subjected seven days to a soil burial test lost 10 per cent. in strength, whereas a similar cotton fabric completely deteriorated in the same time. After seven additional days of soil burial, Vicara showed only little additional loss in strength and no mildew growth could be detected.

Microscopically, the fibre appears as a cylindrical, translucent rod with a circular cross-section. The properties of Vicara are not affected by age. There is no deterioration from weather exposure. No offensive odour is present in the finished fabric in either the dry or wet state.

CHEMICAL PROPERTIES

The acid resistance is very good and weak mediums have very little effect. Strong and concentrated solutions will only weaken the fibre.

Vicara has an amazing resistance to alkalies and is, the makers claim, the only protein fibre that behaves in this manner. In blends with cotton, Vicara can be mercerised. Vicara will not withstand kier boiling. Qualitative analyses of Vicara-wool blends can be carried out by dissolving the wool in an alkaline solution. The alkali resistance is shown in the following table:—

ALKALI RESISTANCE

Sodium Hydroxide (per cent.)	Temperature (°C.)	Time (hours)	Solubility of vicara (per cent.)
5	23	17	0.00
10	23	17	1.70
25	23	17	2.20
5	50	½	0.94
10	50	½	0.93
25	50	½	1.65

Organic solvents, many of which ha[ve] been tried, do not dissolve the fibre. ' the present time, no solvent has be[en] found that will dissolve Vicara.

Vicara is quite water repellent. Th[is] property has been chemically built in[to] the fibre which is also resistant to d[ry] cleaning, laundering, and dyeing. Th[e] water repellency does not interfere wi[th] dyeing or other wet finishing operatio[ns] because its effect is lost at elevated tem[-]peratures and is apparent again up[on] drying.

BLEACHING

Vicara must be bleached in cas[es] where white and certain pastel shad[es] are desired. Several methods of bleac[h]ing have been developed: the hydroge[n] peroxide method, the peracetic aci[d] method, and a two bath process compris[ed] of sodium chlorite and sodium bisulphit[e], the method of bleaching being depende[nt] on the blend.

Tinting colours are available whic[h] can be removed by conventional scourin[g] methods.

DYEING

In view of the affinity of Vicara fo[r] most types of dyes—acid, chrome, direc[t], basic, vat, developed, naphthol, and ace[-]tate—it must be understood that com[-]plete information on the characteristics o[f] each dye is not yet available, and select[-]ive dyes must be used just as they mus[t] be selected for any other fibre being pro[-]cessed for a definite purpose. Sinc[e] Vicara is resistant to strong acids an[d] alkalies, applications of acid dyes at th[e] boil or vat dyes at high pH are possible[.] Dyeing can be carried out in staple form, top, yarn, or fabric.

ACID COLOURS. In some cases, Vicara dyes heavier than wool but this is not a rule. Certain acid colours dye woo[l] heavier and in some instances the shades

are similar. The rate of dyeing can be retarded by pretreatment with tetrasodium pyrophosphate or disodium phosphate.

CHROME COLOURS. In general, the same can be said for the chrome colours as was said for the acid.

DIRECT COLOURS. Most of the direct colours dye Vicara slightly heavier than cotton, but here again this is not a rule since some directs have less affinity for Vicara.

VAT COLOURS. The stability of Vicara to vat colours is good, even up to 10 per cent. caustic soda on the weight of the fibre. Generally speaking, it may be said that the smaller the vat particle size, the better colour penetration. Here again, the shade on Vicara compared with that on other fibres is a matter of selectivity.

ACETATE COLOURS. Affinity for acetate colours is good but preliminary reports indicate resistance to washing, perspiration, and light are slightly lower than when applied to acetate. Even though it was stated that Vicara, in some cases, takes certain dyes heavier than other fibres, in blends with these fibres and with conventional dyeing methods, level shades can be obtained. Several of the dyestuff concerns have tested and are testing Vicara; no generalisation can be made, each dyestuff must be tested. The dyeing characteristics of Vicara are apparently good and Vicara can be dyed without substantial changes in the procedure recommended for each dye. Extensive tests are in progress, not only with fibre and yarn but with 100 per cent. Vicara fabrics, and fabrics blended with nylon, rayon, cotton, and wool.

TEXTILE PROCESSING

Since Vicara is manufactured in tow form, various staple lengths from ½ in. to 5 in. can be supplied. It has been produced in deniers ranging from 1.5 to 10 but at the present time is being supplied in deniers of 2, 3, and 4. These compare to wool grades of 62's to finer than 80's. A crimp has been imparted to the fibre to facilitate processing. Vicara has been processed on the cotton and woollen systems and on the tow-to-top machines.

COTTON SYSTEM. When processed on cotton machinery, both the conventional and long-draft systems have been used. Better yarns have been obtained on long-draft machinery than on conventional machinery due to a more workable staple length of 2-2½ in. as compared to 1-1⅛ in. However, satisfactory spinning reports have been obtained in both instances.

Vicara is fed into the opener and delivered in the form of a lap roll. Here, because the fibre is handled alone, some static may be encountered. A small percentage of an anti-static preparation when applied in the feeder will reduce this problem. After the lap has been blended with other fibres in carding, static is not noticed. Following carding, the sliver is drafted into roving, and spun. Blends have been made with cotton, viscose, acetate, and nylon in both weaving and knitting yarns. Yarns as fine as 50's have been spun, but a decrease in spinning efficiency has been noticed when the yarn count is finer than 36's.

WOOLLEN SYSTEM. Blends with wool, rayon, and nylon have been processed on the woollen system. No difficulty has been met with in mixing, carding, or spinning. Yarns have been both ring and mule spun. The finest yarn made was 7 run.

TOW-TO-TOP SYSTEM. Vicara is obtainable in tow form for use in tow-to-top machines. Experiments have been

(Continued on page 224).

PHARMACEUTICAL RECIPES

FRECKLE LOTION

Honey	4	oz.
Glycerine	1	,,
Alcohol	1	,,
Oil of lemon	6	drops.
Citric acid	180	gr.

Heat the mixture of honey and glycerine for a few minutes over water bath. Then take out and cool. Then add the citric acid and lemon oil after dissolving in the alcohol and finally bottle.

TINCTURE BENZOIN COMPOUND.

Benzoin, in powder	100	grammes.
Storax	75	,,
Balsam tolu	25	,,
Aloes	20	,,
Alcohol 90 p. c. to make	1,000	c. c.

Macerate the benzoin, storax, balsam tolu, and aloes with 800 c.c. of alcohol in a closed vessel for 2 days, shaking occasionally; filter, pass sufficient of the alcohol through the filter to produce the required volume.

SODA MINT TABLETS

Sodium bicarbonate	25.0	grms.
Oil of peppermint	0.3	c. c.
Light liquid petrolatum	1.0	,,
Starch, in fine powder to make 100 tablets	4.0	grms.

Mix the oil of peppermint and liquid petrolatum with the starch, add the sodium bicarbonate, and mix thoroughly by gentle trituration.

Compress in a tablet machine, using 8 mm. die and punch to make 100 tablets.

GLYCERINE SUPPOSITORIES

Glycerine suppositories are very much used to produce faecal discharge in constipation. They act by locally irritating the mucous membrane of the rectum, and are often satisfactory, though never really purgative. As an occasional remedy they are useful but their habitual employment is probably injurious to the mucus membrane.

Gelatin, cut small	14	grains.
Glycerine	70	,,
Distilled water	16	,,

The gelatin is soaked in the water for 5 minutes, or until softened, then drained, and the glycerine added. The mixture is then heated on a water-bath until the gelatin has dissolved and the contents of the dish have been evaporated to a definite weight, which corresponds to 70 p.c. by weight of glycerine.

When the mixture has arrived at the correct weight, allow to stand for two or three minutes, remove the scum that rises, and pour into slightly oiled moulds.

The liquid mass is poured into moulds having a capacity of 15 grains (for infants), 30 grains (for children), 60 grains or 120 grains (adult's medium or large) as may be required.

In moulding the suppositories it is of utmost importance to lubricate the mould with almond oil applied on cotton-wool and invert the mould so that any excess of lubricant may drain out. By doing so the moulded mass will not stick to the surface of the moulds.

FEVER & AGUE MIXTURE

Quinine sulphate	½	dr.
Sulphuric acid dil	½	,,
Syrup of orange	6	oz.
Glycerine	4	dr.
Distilled water to make	8	oz.

Dissolve the quinine in the sulphuric acid and then mix with the other ingredients. Lastly add the water to make up the required volume.

ANTIBILIOUS TABLET

Calomel	¼	oz.
Compound Extract of colocynth	2½	,,
Ipecacuanha Root, powder	30	gr.
Oleo-resin of ginger	1	dr.
Milk sugar	1	oz.
Simple syrup		q.s.

Mix to a slightly damp powder, pass through a 20 hole sieve, dry and compress into 15 gr. tablets.

POWDER FOR WORM CURE

Jalapin	10	gr.
Santonin	20	,,
Calomel	10	,,
Oil of aniseed	2	drops.
Ginger	5	gr.
Sugar	10	,,

Mix. Dose:—2 to 3 grains.

MOUTH WASH POWDER

Sodium perborate	900	parts.
Thymol	1	part.
Menthol	1	,,
Methyl Salicylate	1½	parts.
Eucalyptol	5	,,
Clove Oil	1½	,,

Mix the flavours with a little alcohol and

—Recipes for Small Manufacturers

FLEXIBLE BOOKBINDING GLUE

Glue	30	parts.
Water	29	„
Glycerin	30	„
Salicylic or carbolic acid	1	part.

Soak the glue in the cool water for 2 hours, and melt at temperature of 140°F. Stir the glycerin into the glue after the 140°F temperature has been reached. In the event the glue is kept for a period of time, some effective preservative, such as salicylic acid, carbolic acid, benzoic acid should be incorporated.

LIPSTICKS

Vaseline	15	oz.
Beeswax	10	„
Spermaceti	400	gr.
Carmine	6	dr.

Melt and stir. Allow to cool somewhat before adding perfume. Pour into moulds.

DENTAL RUBBER CEMENT

Para Rubber	1	part.
Benzine	40	parts.
Choloroform	50	„
Gum mastic	12	„
Gum dammar	4	„

Dissolve the rubber in the solvents. Add the gums and stir until they are completely dissolved.

SHOEMAKER'S SEWING WAX

Candelilla wax	2	oz.
Rosin	55	„
Burgundy pitch	20	„
Rosin oil	4	„
Lard	3	„
Heavy mineral oil	1	„

Melt the rosin over slow fire and then mix the other ingredients one by one. Next remove from the fire and allow it to cool.

PLASTIC MOULDING POWDER

Potato starch	200	grms.
Formaldehyde (40%)	80	c. c.
Urea	8	grms.
Water	16	c. c.
Lactic acid	1	„

Mix well until uniform; then heat for 1-2 hours at 90°C in a closed vessel. Remove cake and grind to fine powder. Dry to 8% water content. To this add following solution.

Urea	8	grms.
Formaldehyde	18	c. c.
Ammonia 25%	4	„

Mix well and mould under pressure.

LAUNDRY MARKING INK

Aniline oil	85	parts.
Potassium chlorate	5	„
Distilled water	44	„
Hydrochloric acid, pure (specific gravity, 1.124)	68	„
Copper chloride, pure	6	„

Mix the aniline oil, potassium chlorate, and 26 parts of the water and heat in a capacious vessel, on the water bath, at a temperature of from 175° to 195°F., until the chlorate is entirely dissolved then add one-half of the hydrochloric and continue the heat until the mixture begins to take on a darker colour. Dissolve the copper chloride in the residue of the water, add the remaining hydrochloric acid to the solution, and add the whole to the liquid on the water bath, and heat the mixture until it acquires a fine red-violet colour. Pour into a flask with a well-fitting ground-glass stopper, close tightly and set aside for several days, or until it ceases to throw down a precipitate. When this is the case, pour off the clear liquid into smaller (one drachm or a drachm and a half) containers.

BLACK HAIR DYE WITHOUT SILVER

Pyrogallic acid	3.5	parts.
Citric acid	0.3	„
Boro-glycerine	11	„
Water	100	„

If the dye does not impart the desired intensity of colour, the amount of pyrogallic acid may be increased. The wash is applied evening, followed in the morning by a weak ammonical wash.

LIQUID ROUGE

Eosine	1	part.
Distilled water	20	parts.
Glycerine	5	„
Cologne water	75	„
Alcohol	100	„

Mix.

Rub together with 60 parts of almond oil and add sufficient mucilage of tragacanth to make the mass adhere to the porcelain palette.

—IN THE FIELD OF INVENTION

NEW VENEERING PROCESS

A new veneering process which requires neither heat nor pressure has been developed by an Essex firm.

The process, which uses an adhesive based on rubber, is claimed to give a bond which is proof against water, acid, alkali and mildew. It is said also to absorb most of the stresses and strains likely to be set up by expansion and contraction of the veneer and its base.

All types of materials can be veneered, such as metal, glass, wood, asbestos, cement, cardboard, various types of wallboard and some plastics, although in the case of some materials it is necessary to apply a primer before the adhesive. Interiors of buildings can be veneered and rounded surfaces, such as columns, are easily covered, the only appliance needed to press down the veneer being a hand roller.

With natural and synthetic glues used in veneering, heat and mechanical pressure are generally essential and the time factor critical. Under the new process, however, both the veneer and its base may be kept after treatment in an open position for a considerable time before adhesion is effected. In this aspect, the process is very similar to the use of rubber latex for the dry sealing of envelopes.

—LONDON PRESS SERVICE.

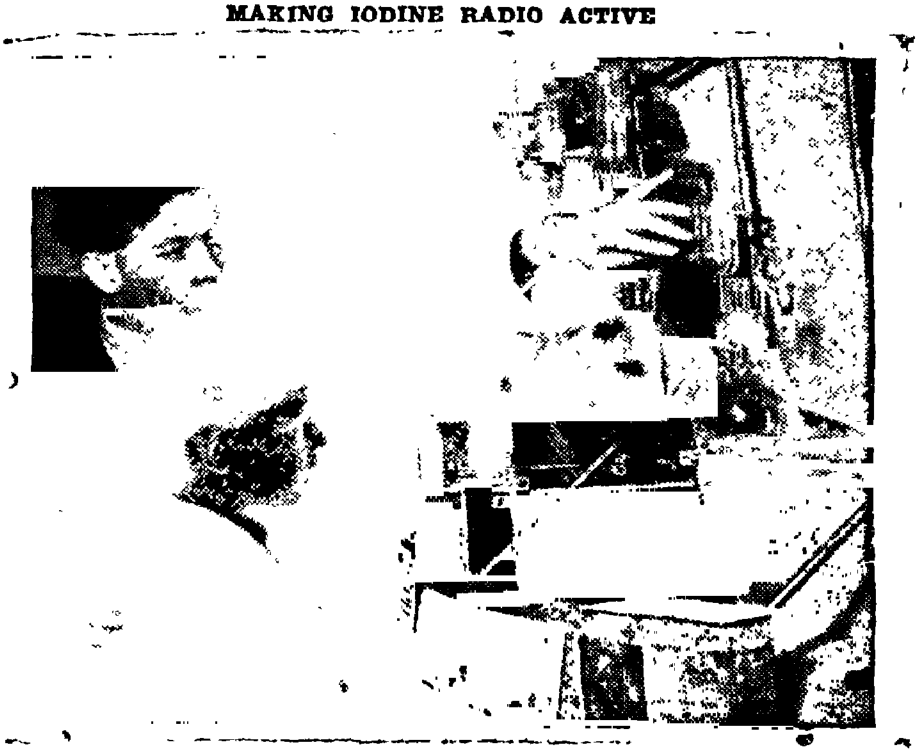
POWDERED SILK IN COSMETICS.

Recently powdered silk has been introduced as a new raw material for the cosmetic manufacture. The physical properties of powdered silk make it well suited to serve as an ingredient of face powder. It spreads easily and adheres tenaciously to the skin, and produces velvety matt finish. It has got a very high absorbent power for moisture (1:3 v/v), and hence it does not become shinny soon. Powdered silk being very light has a very high covering capacity for unit weight as compared with other absorbents such as kaolin, and talc, used in face powders.

The possibilities of it being used in lipstick, rouge, dentifrices, and nail polish has been anticipated.

—SCHEMMEL BRIEF.

MAKING IODINE RADIO ACTIVE



It is understood that a Scientist from the Harwell Atomic Research Station has invented an apparatus, which makes Iodine Radio Active. He recently demonstrated at the British Industries and Fair, London the medicinal and industrial uses of Atomic Energy, as shown in the above illustration.

IMPROVED METHODS OF SULPHURIC ACID MANUFACTURE

A new theory of sulphur dioxide oxidation has been recently developed and embodied in several patents by the Italian chemists: Guarschi G. Maragliano-Busetti and Lucia Pettinati (Chem. Age, 1948, 59, 849).

An improved method has been envisaged for the production of alum by catalysts, whereby plant and operation are simplified and considerable economy in cost and space is ensured. In this invention, the mixture of gases from the pyrites furnace, after purification, is liquefied. The mixture is reduced to $SO_3+\frac{1}{2}O_2$ ratio and led into a heat recuperator attached to the pyrites furnace where the temperature is raised to 450° 480°C. Owing to the high concentration of gas, catalytic reaction takes place giving a high yield.

In another patent on oleum manufacture, instead of the SO_3 being absorbed by the acid in a gaseous state, it is solidified and dissolved in this form in a monohydrated sulphuric acid (98 per cent.) solution. By this all bulky and costly plant parts, such as absorption towers, are eliminated. In the patent by Maragliano-Busetti and Pettimati for the intensive manufacture of sulphuric acid, nitrogen oxides are used as reaction catalysts and accelerators. Sulphuric acid is formed simultaneously with the recovery of liberated nitrogen oxides. The SO_3 is in intimate contact with nitro-sulphuric acid, (nitrosyl sulphate) dissolved in sulphuric acid of over 60°Be. The reaction is at first vigorous and nitrogen oxides are set free in bulk and are oxidized immediately. By suitably varying the amount of nitrosyl sulphate, the composition of sulphurous gas mixture and the temperature, the two phases involved in the cycle become practically simultaneous.

—JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH.

COCONUT OIL-BASE DETERGENT

A new coconut oil-base synthetic detergent called Hi-10 is made by Eureka Chemical Corp. at Los Angeles. The product is odourless and non-soluble. It is obtained by combining coconut oil with amines. The result is a pentavalent nitrogen compound in which coconut fatty acids are combined with amines and aminomethyl compounds.

The new Detergent has been employed to remove from railroad refrigerator cars in which fruits and vegetable are shipped. It can also be employed for general cleaning (Chem. Met. Eng., 1948, 55, 195).

WOOD TREATMENT COMPOUND

Boliden salt, a compound containing sodium bichromate, sodium arsenate and arsenic acid, is being used increasingly in Sweden for the treatment of timber. The compound improves the fire resistance of the timber without affecting its mechanical properties.

DIHYDROSTREPTOMYCIN

By hydrogenation of streptomycin, under pressure and in the presence of a catalyst, adding two hydrogens to the CHO group, dihydrostreptomycin has been produced.

It is marketed as a sulphate and is claimed to be much less harmful than ordinary streptomycin. It can thus be administered for long periods such as is necessary for treating tubercular diseases.

Merck and Co. and Chas. Pfizer and Co are producing dihydrostreptomycin. It costs the same as streptomycin, about $1.58 to $1.7[illegible] per gm.

—MANUFACTURING CHEMIST.

A NEW ALUMINIUM ALLOY

A New Economical Die-Casting aluminium alloy has been developed at the Federated Metal Division of the American Smelting & Refining Company, New York. The alloy is made of copper, silicon and aluminium and is said to overcome former problems of drilling tapping and machining of castings made from other alloys. The new alloy will be known as F-4110, under a nomenclature system developed by the Division, which reveals the composition of the alloy. It contains 4 per cent. copper 11 per cent. silicon, no magnesium and the balance aluminium. There is less tendency for castings to weld to the die during the casting process. It has higher tensile strength yield strength and proportional limit and higher hardness. The castings assume a whiter finish after casting and the final cost of casting is lower because the alloy is generally cheaper than the primary 12 per cent. silicon alloys.

—CHEM. AGE.

NEW PROCESS FOR PIG IRON

A new process for the production of pig iron, stepping up the production of existing furnaces by at least 20 per cent. has been perfected by the Republican Steel Corporation of Cleveland, Ohio. A "pressure blowing" technique is employed which, under certain conditions, is claimed to give an increase of 5[illegible] per cent. in output. The method has been tested in converted blast furnaces of the company. The furnace is partially sealed by a system of valves to retain the hot gases and the incandescent atmosphere thus resulting in building up a high pressure permitting the production of higher temperatures in a shorter time.

—FORMULAS, PROCESSES & ANSWERS

PREPARATION OF SACCHARINE

3199 B.L., Delhi—Wishes to learn the preparation of saccharine.

Saccharine is a compound remarkable for its sweetness. It is made from toluene, of which large quantities are produced in the manufacture of coal gas. The process which is a most complicated one, put briefly, is as follows. The toluene is treated with sulphuric acid, yielding ortho-and paratoluene sulphonic acids which are then converted into calcium salts and further into sodium salts by treating with sodium carbonate. The next step is to act on them with phosphorous trichloride and a current of chlorine, the produce being a mixture of sulphuric chlorides.

These chlorides are separated by crystallisation, orthosulphonic chloride being retained. The ortho-compound is next treated with ammonium carbonate and steam being thus converted into toluene-sulphonic inside, which by oxidation with potassium permanganate yields saccharine. It is generally estimated that sweetening power of saccharine is 300 times of sugar; if one grain of saccharine is added to a gallon of water sweetness is plainly perceptible.

SEWING MACHINE OIL

3203 S P S., Behar Sharif—Wants to know a good formula of sewing machine oil.

Oil of almond	9	oz.
Rect. Benzoline	3	„
Lavender oil	1	„

Mix and filter.

LIQUID GLUE

3208 K.H.W., Sukkur—Wishes to have a recipe of liquid glue.

Gelatin	1	lb.
Water	8	oz.

Allow to stand together in 4 lbs. gallipot until the glue is soft; then put the pot in a saucepan of water, and heat until the glue dissolves. Next add:—

Nitric acid	6	dr.

Stir until effervescence ceases, set aside for 12 hours, and decant.

MILK SUGAR

Sugar of milk is generally prepared from whey, which is left after the separation of casein. When whey is boiled the albumen coagulates and as the process is continued almost to dryness a crude variety of milk sugar is obtained, the evaporation is conducted in vacuum pans instead of ordinary boiling pans. This impure milk sugar contains 85 per cent. of milk sugar, 10 per cent. of water, and nearly 5 per cent. of mineral matter, along with small amounts of protein and fat.

The whey must be worked as quickly as possible, otherwise fermentation may set in, the milk sugar being partially decomposed into lactic acid, which in its turn at once converts the major portion of the remaining milk sugar thereby occasioning a serious loss to the manufacturers. The addition of a little sodium carbonate solution so as to neutralise most of the acid tends to prevent loss of milk sugar by inversion, care being taken to keep the liquid to remain very faintly acid. The addition of a few grains of formalin in place of sodium carbonate also acts well, but is somewhat expensive.

Sour milk must be carefully neutralised before concentrating. Then the whole is gently evaporated until the lactose crystallises on cooling. The evaporation takes place at 60°-70°C in vacuum pans. As the water boils away fresh whey is allowed to pour in continually at such a rate as to maintain the level of the liquid constant. The liquid thus gradually concentrates to 30°—32°Be., when it contains 60 per cent of solid matter, it is then run out into crystallising tanks of sufficient capacity and allowed to cool. In summer this cooling must be hastened by surrounding the tank with cold water. The temperature must come down from 60°C to 20°C in 24 hours. A coarse-grained pasty mass of crude milk sugar crystals separates out at this stage. The whole is then transferred to a centrifugal machine where the crystals are separated from the magma. Then passes away from the centrifugal machine about one-third of the original mass as a syrup still containing a large percentage of milk sugar, which is generally extracted by bulbing live steam through the liquid of density 15°Be. This coagulates the albumin, which collects on the surface, and which is left behind as a cake when the syrup is run off. The cake is next pressed between folds of cloth, ground, mixed with potatoes, turnips and used as a food for pigs.

The syrup at 35°Be, thus freed from albumin, is once more run into the vacuum pans, concentrated, allowed to crystallise after

standing for several days in well-cooled vessels, diluted with water and treated with a centrifugal machine. This produces a further yield of 0.3 to 0.7 per cent. of impure milk sugar. The total yield of crude milk sugar is about 4.35 per cent.

PHOTO DEVELOPER FOR NEGATIVE

3300 M.L., Ballia—Desires to know a good formula of photo developer for negative.

Distilled water at 125°F	16	oz.
Metol	115	gr.
Sodium sulphite (desiccated)	2½	oz.
Hydroquinone	29	gr.
Sodium carbonate (desiccated)	1¼	oz.
Potassium bromide	43	gr.
Cold distilled water to make	1	gallon.

Mix in the order given. Develop 6 to 12 minutes at a temperature of 65°F.

MEANING OF Z.D.C.

3212 R.C.C., Jaora—Wants to know the full chemical name of Z.D.C.

Z. D. C. is an accelerator used for compounding rubber latex. Its full name is zinc dimethyldithio carbonate.

SILVERING GLASS.

3236 G.C.S., Tumsar—Desires to know a method of silvering glass.

Prepare the following three solutions and stock separately, number two preferably in an amber coloured bottle.

SOLUTION No. 1.

Dissolve 25 grains of sugar in about 250 c.c. of distilled water and add 3 grams. of tartaric acid. Boil the solution for 10 minutes, cool, add 50 c.c. of ethyl alcohol and dilute with distilled water to 500 c.c.

SOLUTION No. 2.

Dissolve 20 grams. of silver nitrate and 30 grams. of ammonium nitrate in water and make up to 500 c c.

SOLUTION No. 3.

Dissolve 50 grams. of caustic soda in water and make up to 500 c.c.

Thoroughly clean the glass free from a grease and finger marks. Rapidly mix equ volumes of each of the above solutions and flo the mixture on to the glass. In a few momen a well adhering coat of metallic silver wi be deposited on the glass when same may b rinsed well with distilled water and allowe to dry.

OXIDIZING FINISH FOR BRASS

3238 A.A., Delhi—Wishes to have a proces of oxidizing finish for brass.

A blue-gray or blue-black colour can b produced on brass by boiling the brass part in the following solution until the proper colou is obtained. This usually requires betwee 10 to 20 minutes.

Sodium Thiosulphate	8	oz.
Lead Acetate	4	„
Water	1	gallon.

Another solution may be made of the sam ingredients by varying the concentration witl a view to changing the colour. This solutio is as follows:—

Hyposulphite of soda	12.8	oz.
Sugar of lead	25.6	„
Water	1	gallon.

An entirely different solution may also b used to produce the blue-black finish.

Copper Carbonate	16	oz.
Ammonia	1	qt.
Water	3	„

Add the water after the copper carbonat and ammonia have been thoroughly mixed Use the solution at a temperature of 175°F. an immerse the work until the proper colour i obtained. This usually requires one-half to on minute. For operation over a period of tim there must be an excess of copper carbonat present.

BLACKENING CAST IRON

It is possible to produce a black finish c cast iron that has been polished and free fron oil and grease by applying the followin mixture:—

Copper sulphate	8	oz.
Nitric acid	15	„
Alcohol	30	„
Water	125	„

Allow this solution to dry on work an when quite dry rub with woollen cloth. A thi film of oil should be applied for final protection

JET BLACK FINISH FOR COPPER

Water	1	gal.
Muriatic acid (3%)	8	oz.
White arsenic	1	„
Oxide of iron	1	„
Sulphate of copper	1	„

Use steel anodes, Voltage, 1 to 3; Amperage 5 to 15 per sq. ft.

In preparing the arsenic should be dissolv ed in full strength, muriatic acid, slightl warmed. If used for heavy production solu

tion should be replenished frequently, the deposit is very rapid if solution is run at about 110°F.

SILVERING POWDER

3256 S.S., Samalkot—Wishes to have a good formula of silvering powder.

Silver chloride	1	tola.
Common salt	1¼	tolas.
Washing soda	3	„
White chalk powder	2½	„

Powder each separately and weigh in a well dry condition and mix well the whole and pack it in 1 oz. size screw top or widemouthed cork bottle.

For silvering the articles made of brass, copper, German silver, etc., first clean them well with chalk powder and wash with clean water. After cleaning the article from dirts and dusts apply this silvering powder with a small piece of clean cotton rag when the article is wet. Rub briskly all over the place with this powder for some time and wash with water. Two or three coats in this way will give a good deposit of silver on the articles. To get cleaner and brighter surface on the article it must be cleaned thoroughly before applying this powder.

DEODORIZING KEROSENE OIL

3258 R.P., Patna—Wants to have a process of deodorising kerosene oil.

Potassium permanganate	1	ounce.
Sulphuric acid	½	pint.
Water	3½	pints.

Mix the acid and water, and when the mixture has become cold pour it into a 2 gallon bottle. Add the permanganate and agitate until it is dissolved. Then add benzine, 1 gallon, and thoroughly agitate. Allow the liquids to remain in contact for 24 hours, frequently agitating the mixture. Separate the benzine and wash in a similar bottle with a mixture of:—

Potassium permanganate	¼	ounce.
Caustic soda	½	„
Water	2	pints.

Agitate the mixture frequently during several hours; then separate the benzine and wash it thoroughly with water. On agitating the benzine with the acid permanganate solution an emulsion-like mixture is produced, which separates in a few seconds, the permanganate slowly subsiding and showing considerable reduction. In the above process it is quite probable that the time specified (24 hours) is greatly in excess of what is necess as the reduction takes place almost entirel a very short time. It has also been sugge that if the process were adopted on a m facturing scale, with mechanical agitation, time could be reduced to an hour or two.

INSULATING VARNISH

3268 S.L.M., Nagpur—Wishes to hav good formula of insulating varnish.

Phthalic anhydride	235	parts.
Glycerin	118	„
Succinic acid	235	„
Ethylene glycol	230	„
Rosin	200	„
Tung oil	80	„

Mix the ingredients together and heat 250°C as quickly as possible and keep it at temperature until the rosin has become cl

VERMILION

3290 M.M.D., Calcutta — Wants a g recipe of vermilion.

Red lead	½	lb.
Imitation vermilion	1	„
Venetian red	½	„

Mix.

CATCHETS

3291 S.S., Calcutta—Desires to know process of making catchets.

Catchets are also known as wafers. Th are prepared by mixing wheat or rice flour w sufficient water to produce a thick viscous fl This is then spread thinly over a steel p moistened with grease to prevent the sheet f sticking. The mass is next dried over steam. When dry the sheets are taken and cut into small discs by means of a pu medicament is put over a disc, and ano disc slightly moistened over at its circumfere with water is pressed over the former. catchets thus produced may be taken in by patient with no bitter taste on the tongue.

CHEWING GUM

3302 H.L.B., Jharsuguda—Wants to h a good formula of chewing gum.

Granulated sugar	32	parts.
Glucose	32	„
Water	32	„
Agar-agar	1	part.
Lump white starch	1	„

Soak the agar-agar in cold water be use. Remove and put in a large pan with water, and dissolve by simmering, then through a fine sieve. Next mix starch in

little water, and put the whole into a large pan, and boil to jelly point, stirring as required.

Then, colour, flavour and add tartaric acid to taste. Then run out, and dry in a stove for two days.

ACTIVATED CARBON

2950 K. S., Cuddalore—Wishes to have a process of making activated carbon and also isinglass.

To produce activated carbon calcine saw-dust or peat at 400°—700°C. with zinc chloride so as to yield a dry ratio of 3.1 (cellulose material to zinc chloride) and phosphoric acid amounting to 2½ to 10 p.c. of the zinc chloride.

ISINGLASS

Isinglass or fish glue is a yellowish white or greyish yellow, transparent, very tough and flexible substance. It is principally manufactured from the bladders of the sturgeon and other fishes belonging to the same family. The bladders, after being placed in hot water, are cut open, washed, and exposed to the air with the inner, silvery skin upward. This is then removed by rubbing, placed in moistened cloths, pressed, and then taken from the cloth and laid either in serpentine windings between three small blocks or placed together in sheets like a book and dried.

TEXTILE SOAP

2942 S.S.W., Conjeevaram—Wants to have a formula of textile soap.

Castile soap	200	parts.
Tallow soap powdered	95	"
Soda ash	20	"
Borax	10	"
Turpentine oil	25	"
Caustic soda	20	"
Water to dissolve the alkalies	30	"

Dissolve the caustic soda and the water and then add the soda ash and borax. Mix this with the castile soap and tallow soap powdered. Lastly spray over the whole the specified amount of turpentine oil.

SAL-AMMONIAC CAKE

3201 M.C., Delhi—Desires to know the method of making Sal ammoniac cake.

Sal-ammoniac of commerce is met with either in a crystalline state or as a compact fibrous material. It is obtained by subliming crude ammonium chloride. The operation is carried out in earthenware vessels or large glass flasks. The crude salt is first mixed with 20 to 30 per cent. of its weight of powdered animal charcoal, then dried over a good fire and next put into the stoneware sublimation vessels placed in rows over brick built oven. The openings of the vessels are surrounded by an iron plate properly fitted to the neck and provided with a flange upon which rest the earthenware vessels wherein the sublimed sal-ammoniac is condensed. The sublimation is carefully conducted, and goes on slowly, lasting about 12 to 66 hours. After which the plates are removed, bungs or plugs of cotton-wool inserted, and the vessels of flasks allowed to cool very gradually, for as the salt expands on cooling the vessels may be broken. The cake of sal-ammoniac when quite cool is scraped clean with a knife, and afterwards presents a perfectly crystalline appearance. When it is desired to obtain the salt free from iron, the crude salt should be mixed, before sublimation, with about 5 per cent. of super-phosphate of lime, or with 3 per cent of ammonium phosphate by this addition any iron chloride is decomposed and left in the retort as phosphate.

GRAMOPHONE RECORD COMPOSITION

3309 K.D.W.M., Kanauj—Wishes to know a composition of gramophone record.

I.

Shellac	25	parts.
Copal gum	5	"
Barytes	65	"
Nigrosin or carbon black	5	"

Grind the shellac in a special type of disintegrator to 80 mesh, the barytes and gum copal to 200 mesh. Then mix up all the ingredients together. Now mix to a uniform paste either between hot rollers moving towards each other at different speeds or in an internal masticator with a steam jacket. Next press the plastic mass into sheets by a pair of internally cooled rollers moving at equal speed and cut into oblong slabs 7 to 8 oz. in weight and ⅛" thick for 10" diameter records. Finally press the slabs by means of stamping press preparatory to sound recording.

II.

Vinyl resin	90	parts.
Chromium oxide	7.5	"
Carbon black	50	"
Calcium stearate	1	part.
Carnauba wax	1.5	"
Chlorinated naphthalene	4.5	"

GRAFTING WAX

3316 U.T.M., Ye-u—Wants to have a good formula of grafting wax.

Wool grease	11	oz.
Rosin	22	„
Paraffin wax	6	„
Beeswax	4	„
Japan wax	1	„
Rosin oil	9	„
Pine oil	1	„

Melt together until clear and pour into tins. This composition can be made thinner by increasing the amount of rosin oil and thicker by decreasing it.

PHOTOGRAPHIC PRINTING PAPER

(a) 4 per cent. cellaidin colladion, 620 c.c.; sulphuric ether 100 c.c.; alcohol (.796) 30 c.c.; (b) Silver nitrate 25 grains; distilled water 25 c.c.; alcohol (.796) 120 c.c.; (c) Calcium chloride crystals 4 grains; distilled water 4 c.c.; alcohol 5 c.c.; (d) Citric acid 5 grains; distilled water 5 c.c.; alcohol (.796) 30 c.c.; (e) Castor oil solution (1 of oil in 2 of alcohol) 15 c.c.; glycerine solution (glycerine 1; alcohol 2) 15 c.c. Now add (b), (c), (d) and (e) to (a) in this order with thorough shaking. Coat on baryta-faced paper and allow to dry. The operation must be conducted in darkness. This gives a paper especially suitable for separate toning baths.

WATER COLOUR TABLETS

3325 A.K B., Kanpur—Desires to know processes of making water colour tablets and ink tablets.

Artists' water colours may be prepared by grinding the respective pigments, previously reduced to powder, into a smooth paste with equal weights of isinglass size and thin gum water. The paste is then compressed into squares as tightly as possible. and dried with a very simple heat. Old crumbling cake colours should be powdered very finely in a mortar, sifted through fine muslin, and ground up as above, the gum water being omitted. The powders, rubbed up with honey to the consistence of cream, constitute moist colours.

INK TABLETS

Methylene blue	4	oz.
Methyl violet	1	„
Dextrine	8	„
Boric acid	1	„
Starch	1	„
Water	sufficient to moist the powders.	

Mix the methylene blue, methyl violet, dextrine and boric acid. Moist the mixture with a small amount of water. Expose the whole to dry in the sun and then break into a coarse powder. Mix the starch and compress into tablets of usual size.

VARNISHED CLOTH

3354 S.V., Lucknow—Desires to know the process of making varnished cloth.

Varnished cloth is commonly known as the Empire cloth. It finds wide range of uses as an insulator, particularly as a tape for taping and connections and in power transformer work. Until recently it was also frequently used as slot insulation on conductors in large machines.

To make varnished cloth first of all treat it with a special starches before varnishing in order to protect the fibres from the action of organic acids liberated during oxidation of the varnish employed. Only pure starches, as for instance, those prepared from potato, wheat, corn, etc. are used for these purposes. Before dressing with starch, bleach and scour the cloth to remove any sizing and filling which may have been put in by the manufacturers.

After starching any of two varnishes as appeared below may be employed resulting in either a yellow or a black finished product. The yellow varnishes are produced from linseed oil or tung oil, with a small amount of either natural or synthetic resin and thinned down with benzine.

Black varnishes are produced, using either linseed oil or tung oil as a base, but with asphaltum mixed in place of the resins employed in yellow varnish. These are also thinned down with benzine.

The process of varnishing is carried out by passing the prepared cloth through vats of varnish, after which it is made to ascend vertically through towers, in which the temperature is carefully controlled. The temperature usually employed is in the neighbourhood of 105 to 115°C. The cloth returns down the towers and reaches the bottom in a condition sufficiently dry to be either rolled directly or kept exposed to air at ordinary room temperature until the varnish has completely matured.

WOOD PRESERVATIVE

I.

Sodium dichromate	20.6	parts.
Arsenic acid	55.9	„
Zinc oxide	12.8	„
Zinc chloride	10.7	„

This is dissolved in water before use and the wood is impregnated with it.

II.

Potassium dichromate	34	parts.
Copper sulphate	30	„
Chromium acetate	6	„
Boric acid	30	„

Mix. Use as above.

FLUORESCENT SIGNS

3389 P.C.S., Ajmer—Wants to have formulas of making fluorescent signs.

Glass signs made from tubings filled with a solution of umbelliferone, uranine, or other dye, and under ultraviolet light, may be used in show windows and for advertising as a cold source of coloured light, as well as to substitute for neon signs.

Small particles of fluorescent minerals can be embedded in a wax backing and made into signs. These are very colourful under ultra-violet light.

FLUORESCENT POWDER

225 grams of zinc oxide and 700 grams of tungstic oxide with an admixture of 1.5 gram lead nitrate are formed into a paste with distilled water. The mixture is dried and ground, and heated to 1,000°C. for several hours.

CASTOR OIL CHOCOLATE LAXATIVE

3408 S.C., Delhi—Wants to have a recipe of preparing castor oil chocolate laxative.

Castor oil No. 1	1	part.
Refined sugar	2	parts.
Chocolate powder	1	part.
Tincture of vanilla	q.s.	

Incorporate the castor oil with the chocolate powder; add the sugar, with which the vanilla tincture has been thoroughly mixed. Work the ingredients well together in a fairly warm mortar and while soft place it in moulds or cut to desired size in a cold marble slab. Allow to cool and pack.

DUPLICATOR INK

3411 H.M.W.—Wishes to have a formula of duplicator ink.

Methyl violet	5	parts.
Diamond green	5	,,
Dextrin	2	,,
Gum arabic	2½	,,
Hydrochloric acid	6	,,
Carbolic acid	½	part.
Hot water	80	parts.

Dissolve the dextrine and gum arabic in the hot water. Then dissolve in it the methyl violet and diamond green and add the hydrochloric acid. Lastly mix the carbolic acid, which acts as a preservative.

TRANSPARENT PRINTING INK

3440 S.M.D., Ambala—Wishes to have a recipe of transparent printing ink.

Lithographic varnish	28	parts.
Glycerin	36	,,
Dye	18	,,
Ammonium nitrate	4	,,
Ester gum	14	,,

Mix and triturate in a mortar for several hours or until uniformly mixed.

(Continued from page 214)

carried out and are continuing on several types. Very fine, even yarns have been made by breaking the tow and drafting it in 3 to 5 subsequent drawings. These yarns have consisted of 100 per cent. Vicara, and blends with wool, viscose, and nylon. Single 30's, cotton count, have been made.

Very good spinning properties on all systems have been reported. As has been mentioned, during the carding of 100 per cent. Vicara, some static has been encountered but this has been easily overcome by treating with conventional oils and anti-statics. In blends the static problem is less apparent.

No change in machine settings is necessary except an occasional adjustment which is relative to every new mill run. In cases, Vicara aided spinning efficiency.

Many types of fabrics have been knitted and woven. These fabrics have been tested and have shown good wearing qualities, excellent drape, resistance to crease, and resistance to yarn slippage. The draping quality and resistance to crease, points to the use of Vicara in blends to be used for summer suiting fabrics.

—TEXTILE RECORDER.

—BRIEF QUERIES AND REPLIES

1268 G.D., Meerut—Hair fixer may be prepared by mixing tragacanth (5 parts), with alcohol (5 to 10 parts) and glycerine (5 to 6 parts) and perfuming the mixture and then adding all at once. 75 to 85 parts of water.

1275 P.K.D.C., Srimangal—Wants to be put in touch with Kuldip products manufacturers.

1276 S.M.S., Karachi—Mantles are knitted rom artificial silk fabric, cut into suitable engths and stitched. These are next dipped in he following impregnating solution: Thorium itrate 1000 parts; cerium nitrate 10 parts; nagnesium nitrate 1½ parts; beryllium nitrate parts and distilled water 2000 parts. Mix. he time of immersion of the artificial silk iantles varies from about 2 minutes to about 3 minutes according to the nature of artificial ilk. You may consult Manufacture of Batries, price Rs. 3/7/- including postage.

1277 V.C., Cocanada—For chemical dia. ionds enquire of Hamilton & Co. Ltd., 8, Old ourt House Street and M. Lilaram & Co., A4, ew Market; both of Calcutta. For starting a osiery factory you have to invest Rs. 30,000 for achinery and other equipment, Rs. 10,000 for irn, etc. and Rs. 10,000 as reserve fund.

1286 N.A.K., Pilibhit—You may arrange r training in agriculture and farming in S.A. This line has good prospect.

1287 S.K.M., Tanjore—Formulas of gerb, loured fires, etc. will appear in Formula Secn in due course.

1290 S.R.A., Mayavaram—We have not blished any book on paint manufacture. You iy however consult Chemistry and Technology Paint by M. Toch. Process of manufactur; distemper appeared in March 1949 issue of lustry. Collapsible tubes may be had of tal Box Co. of India Ltd., B2, Hide Road, lcutta.

1293 M.B., Darjeeling—Address of Indusal Finance Corporation of India is P2, Mission w Extension, Calcutta.

1294 B.D.T.C., Jullundur City—We have no k on paint manufacture. You may however sult Chemistry and Technology of Paint by Toch. For machines you may enquire of rshall Sons & Co. Ltd., 99, Netaji Subhas d; Jessop & Co., 93, Netaji Subhas Road and kart Bros., 8, Netaji Subhas Road; all of cutta. You better consult an expert. For ting a paint factory you have to invest at t Rs. 50,0000/-.

1295 G.D., Agra—Waxes and other ingredimay be had of Banshidhar Dutt, 126, Khenatty Street and Calcutta Chemical Co. Ltd., Bonfield Lane; both of Calcutta.

1296 A.S.B., Madras—You may print some ilar describing your business. Now post circular letters to hides and skin mer- ... tion. Intending buyers will communicate direct with you.

1299 R.R.P.C., Hajipur—Stearic acid and stearine may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta. For wax soluble colour enquire of Champalal Agarwala, 45, Armenian Street, Calcutta.

1300 H.S.G., Simla—Process of manufacturing disinfecting fluids of various types will be found in Manufacture of Disinfectants and Antiseptics published from this office, price Rs. 3/7/- including postage. Following is a list of balance dealers: D. Ghose & Co., 36-37, Khengrapatty Street; Girish Chandra Ghose, 58, Netaji Subhas Road and S. Dass & Bros., 84A, Netaji Subhas Road; all of Calcutta.

1301 M.C.D., Tinsukia—Process of manufacturing zarda and kimam will be found in Indian Tobacco and Its Preparations published from this office, price Rs. 3/7/- including postage.

1318 P.J., Sonepat—Following is a list of scientific apparatus dealers: Adair Dutt & Co., Stephen House, 5, Dalhousie Square East, Calcutta; Scientific Mart, 47C, Garpar Road and Indian Scientific Stores, 14/2, Old China Bazar Street; all of Calcutta. For an exhaustive list you may consult Industry Year Book & Directory published from this office.

1320 J.S., Porbandar—For supplying clay you may negotiate with the following firms: Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane; Bengal Supply Co., 23, Strand Road and Central Supply Co., 2, Church Lane; all of Calcutta.

1327 S.K.G., Calcutta—For starting a hosiery factory you have to invest Rs. 50,000/-.

1333 R.O.T., Delhi—Following is a formula of labelling paste for tin: Wheat flour 256 parts; boric acid 2 parts; nitric acid 3 parts; glycerine 2 parts; cold water 1280 parts. Mix the flour and boric acid with water into a smooth paste, then stir in the glycerine then nitric acid and slowly boil the whole until thick.

1334 S.W., Madras—Hydroxy citronellal and citronellal hydrate are one and the same chemical. You may use the same trade mark in case of bedbug exterminator. You need not take any licence for manufacturing bedbug exterminator.

1338 M.G., Tinsukia—There is nothing as etholian glycol but ethylene glycol. It is somewhat viscous liquid, having a sweet taste and miscible with water. It is used sometimes in toilet preparations in place of glycerine. It is mainly produced in U.S.A.

1341 S.K.U., Wardha—You may try the following formula of washing soap: Coconut oil 20 lbs; groundnut oil 10 lbs; linseed oil 10 lbs; caustic soda 8 lbs; salt (in fine powder) 8 lbs; wheat flour 5 lbs; water 80 lbs. Proceed by hot process.

1342 G.L.N., Coimbatore—It is not possible to manufacture cigarette and camphor with Rs. 5,000/- on commercial scale.

1343 A.E.I., Calcutta—Cigarette making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. Raw materials for pencil manufacture are available in India. But raw materials for other industries are not available in India at present.

1345 B. L. V. S., Phagwara — Process of manufacuring tartaric acid will appear in Formula Section in due course. It is not possible to manufacture tartaric acid with Rs. 1,000 on commercial scale.

1349 A.K.D., Chinsurah—Sugar candy is prepared from a saturated solution of sugar formed by adding sugar to boiling water till it dissolves no more. The solution is then run into troughs in which it is allowed to cool slowly, while a number of threads are hung in the liquid upon which the crystals form, and continue to grow. The time required will depend on the bulk of sugar treated. In working on a small scale it will be necessary to remove the strings and adhering crystals; then add more sugar to the liquid, boil up, and immerse the strings again while the liquid is cooling. Cakes of candy will also separate on the sides of the vessel in which the liquid cools.

1358 N.E., Nellore—Chemicals may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta.

1359 S.K.P., Lashkar—Write your letter with advertisement number care of Industry when your letter will be duly redirected.

1360 R.K., Ludhiana—We are not aware of any such chemical.

1363 D.R.S.M., Mysore—Following is the process of manufacturing slate pencils: Ground slate 60 parts; ground limestone 30 parts; silicate of soda 10 parts. Knead the ingredie[nts] together into a plastic mass and then for[ce] through a perforated slate. The pencils a[re] next cut into desired sizes when dry. T[he] shaping is done by laying the pencil in a troug[h] the bottom end being gripped automatically [in] a holder which revolves at an angle and t[he] end is held against a rough stone revolving [at] high speed in water.

1365 S.S.F., Sandalankawa—Your query [is] not in our line. You better consult a radio e[n]gineer.

1368 M.I., Sargodha—For generating ele[c]tricity by Diesel Oil engine you should use [a] dynamo which will be worked by oil engine.

1369 M.M.S.R., Jammu—You may ref[er] your query to the Controller of Imports, Ne[w] Delhi. As regards addresses of U.S.A. write [to] American Trade Commissioner, 9-10, Esplana[de] Mansion, Calcutta.

1374 S.K.B., Ramgunj—It is not possib[le] to recharge exhausted dry cell.

1377 K.C.P., Ganjam—For denatured spi[rit] enquire of the following firms: Carew & C[o.] Ltd., 4, Fairlie Place; Dr. Bose's Laborato[ry] Ltd., 53, Raja Dinendra Street and Bengal Br[e]weries Ltd., 6, Mission Row; all of Calcutta.

1381 M.L.C., Delhi—We cannot supp[ly] you any formula of patent article. Followi[ng] is a formula of hair dye powder. Paratolu[y]lene diamine 21 grm. sodium sulphite crysta[l]lised 50 grm. Mix. For use dissolve 7½ grm in 100 c.c. of water and add to it a little hydr[o]gen peroxide and then apply over the hair wi[th] a camel hair brush.

1384 A.R.B., Bhawanipur—All the mac[hi]nes you require may be had of Small Mac[hi]neries Mfg. Co., 22, R. G. Kar Road; Orient Machinery Supplying Agency Ltd., P12, Missi[on] Row Extension and Balmer Lawrie & Co. Lt[d.] 103, Netaji Subhas Road; all of Calcutta.

1386 P.N.R., Bombay—Process of man[u]facturing plates for batteries and cases f[or] motor car batteries will appear in Formula Se[c]tion in due course.

1389 L.W., Katni—You may write dire[ct] to the firms describing the nature of your bu[si]ness.

1391 B.D., Meerut City—Formulas of pa[n] masala liquid, powder and tablets will appe[ar] in formula section in due course.

1401 H.L.S., Ranchi—For the book requir[ed] enquire of W. Newman & Co., Ltd., 3, Old Cou[rt] House Street, Calcutta and Thacker Spink [&] Co. (1933), Ltd., 3, Esplanade East, Calcutta.

1404 S.R.G.S., Calcutta—Refer your que[ry] to the Controller of Exports, New Delhi.

1405 A.E.W., Phillaur—For books on di[es] and presses enquire of Alfred Herbert (India) Ltd., 13-3, Strand Road, Calcutta.

1410 U.T.C., Delhi—For transfer labels e[n]quire of Signograph Co., Baranagore, 24-Pa[r]ganas.

1411 C.R.B., Poona—Button hole maki[ng] machine may be had of Watson & Co., Ltd., 1 British Indian Street and Subol Dutt & Son[s] 4, Clive Ghat Street; both of Calcutta.

1412 B.N.C., Bhagalpur—Address of J. Sur & Co., is 2, Dalhousie Square, Calcutta.

1413 B.D.R.B.M., Shikohabad—Following is a list of newspapers: Cochin Argus, Cochin; Deepam, Deepam Road, Ernakulam, Cochin; Lokaprakasam, Lokaprakasam House, Trichur, Cochin and Malabar Herald, 111-98, Bastian St., Cochin.

1414 I.P.J., Saharanpur—For calcium bichloride enquire of Calcutta Chemical Co., Ltd., 35, Panditia Road, Ballygunge and Bengal Chemical & Pharmaceutical Works Ltd., 164, Manicktala Main Road; both of Calcutta.

1416 S.K.S., Bombay—For tubes enquire of Calcutta Conduit Co., 6, Kalikrishna Tagore St., Calcutta; Indian Tube Co., Ltd., Block A, 41, Chowringhee Road, Calcutta and United Pipe & Tube Co., 9, Royal Exchange Place, Calcutta.

1417 A.K.N.S., Dharmavaram—We have no book on thread manufacture. In order to make the thread stronger twist it and apply sizing. For machines enquire of W. H. Brady & Co., Ltd., Lall Bazar, Calcutta.

1418 R.C.P., Hoshiarpur—Process of manufacturing disinfecting powder, vimto, vino, etc. will appear in Formula Section in usual course. Following is a list of Consul-Generals you require: Consul-General for Czechoslovakia, West View, 87, Wodehouse, Colaba, Bombay; Consul-General for Belgium, 24-1A, Alipore Road, Alipore Calcutta; Consul-General for France, Flat 26, Park Mansions, Park Street, Calcutta; Consul-General for Netherlands, Royal Insurance Bldgs., 27, Dalhousie Square, Calcutta and Consul-General for Poland, 19A, Cuffe Parade, Colaba, Bombay.

1419 P.C.V., Aligarh—Following is a list of radio training institutes: Abdulla Fazalbhoy Institute; St. Xavier's College, Bombay; Chicago Radio Institute, 129, Esplanade Road, Fort, Bombay; Institute of Radio Technology, Jetharam Baug, Bombay 14; Radio College, 191, Bow Bazar Street, Calcutta; George Telegraph and Training Institute, 136, Bow Bazar Street, Calcutta and College of Wireless and Commerce, 212, Bow Bazar Street, Calcutta.

1421 J.P.S., Muzaffarpur—You should dry the starch thoroughly so that no water particles remain in it. Starch is sold in the market in powder. If you dry the starch in the sun the product will be discoloured.

1422 A.K.C., Calcutta—Mosquito oil is efficacious when applied on body.

1423 G.V.N.R., Harivaram—For electric fans enquire of Clide Fan Co., Ltd., 21-2, Chowringhee Road and G. T. R. & Co., 6, Netaji Subhas Road; both of Calcutta.

1424 V. M., Nagpur—Process of manufacturing artificial musk will appear in Formula Section in due course. Following is a formula of imitation gold: Copper 90 parts; gold 2½ parts; aluminium 7½ parts. Melt the copper and the gold in a crucible composed of refractory material or of a mixture of unburnt fireclay and dust of fire-bricks, glass pots or seggars and when the metals are fluid the aluminium is added; when not more than 2 lbs. of the alloy are made at one time the mass is kept in a fused state for half an hour, about 1¼ oz. of borax being added as a flux. The melted mass is then poured into ingots.

1425 K.B.K., Kilakkencherry—For homeo medicine enquire of C. Ringer & Co., Norton Bldgs., Lall Bazar, Calcutta; Dhar Roy & Co., 80, Netaji Subhas Road, Calcutta and King & Co., 90-7A, Harrison Road, Calcutta.

1427 A.C., Delhi—You may use soluble dextrine in manufacturing ink tablets. For manufacturing red ink tablets you may use scarlet dye.

1428 G.J.B.W., Mysore—Soap making machine may be had of Small Machineries Mfg Co., 22, R. G. Kar Road, Calcutta. Soap making materials may be had of Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta.

1429 M.A.S., Hoshiarpur—For hydrogenation plant enquire of Volkart Bros., 8, Netaji Subhas Road and Marshall Sons & Co., Ltd., 99, Netaji Subhas Road; both of Calcutta.

1430 R.N.S., Sambalpur—For magic lantern and photo machines enquire of Photographic Stores & Agency Co., Ltd., 154, Dharmatala St., Calcutta. For hosiery machine write to W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1431 K.B., Gauhati—For distilling plant you may enquire of Adair Dutt & Co., Stephen House, 4, Dalhousie Square, Calcutta. Acetic acid is manufactured from sawdust. Process of manufacturing acetic acid from saw dust will be found in Chemical Industries published from this office, price Rs. 3-7 including postage.

1432 S.C., Kalutara—You may consult Manufacture of Slate published from this office, price Rs. 1-15 including postage.

1433 G.G., Rairangpur—For granite stone cutting machine enquire of Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, Calcutta.

1434 J.M., Purulia—Process of deodorising vegetable oils will be found in Vegetable Oil Industry published from this office, price Rs. 3-7 including postage.

1443 P.N.B., Calcutta—Soap making machines may be had of Small Machineries Mfg.

Co., 22, R. G. Kar Road, Calcutta. The firm will supply you with an estimate for starting a soap factory with their machines.

1444 M.G.A.B., Srinagar—For caps enquire of Dinshaw M. Mistry, Jer Mahal, 522, Kalbadevi Road, Bombay and Seth Brothers, 377, Kalbadevi Road, Bombay.

1448 S.S.S., Firozabad—For trade mark registration write to A. Mitra & Co., 5-2E, Raja Rajballav Street, Calcutta.

1449 V D., Trichinopoly—You may start a hosiery factory. For machinery you may enquire of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1450 B.A., Saharanpur—Address of H. S. Cox & Co., is not known. You better refer your query to Adair Dutt & Co., Stephen House, 4, Dalhousie Square, Calcutta.

1451 Y.J S., Mandapeta—Address of Dr. Bose's Laboratory is 45, Amherst St., Calcutta.

1452 S.C.G., Kanpur—Process of manufacturing tooth powders of various types will appear in Formula Section in due course.

1453 D M., Mukteswar—We are not aware of any such institute.

1456 R.K S C, Anand—To communicate with any querist write him with number and initials care of Industry when your letter will be duly redirected. You may send sample yourself.

1457 A.C., Coimbatore—Bucket making machines may be had of Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta.

1458 R.K.M.S, Narsapur—For further bleaching guts you may use hydrogen peroxide. Or you may use the following solution: Solution is made of 4 oz. caustic potash and 4 oz. carbonate of potash in 3 to 4 gallons water for treating the gut.

1462 M.A.C.S., Lagos—You may consult our publications. You may consult Indian Tobacco and Its Preparations; Home Industries; Indian Perfumes, Essences and Hair Oils; Vegetable Oil Industry, etc.

1464 S B M., Hubli—For tamarind seed grinding machine enquire of Balmer Lawrie & Co., Ltd, 103, Netaji Subhas Road, Calcutta. This is mainly used in cotton and jute mills as sizing materials.

1466 M R S S, Ludhiana—Horns are made into sheets by cutting with special machines. Then buttons are made from this sheet.

1468 V.Y.S., Bijapur—Hindi equivalent of parsley is not known. It is known as chandani in Bengali. Chua is dregs obtained by distilling sandal wood.

1469 R.K.A., Kanpur—A good formula of marking ink appeared in March 1949 issue of Industry.

1471 N.C., Veraval—Process of manufacturing plaster of paris, distemper, etc., will appear in Formula Section in due course.

1473 B.K.S., Hoshiarpur—Thank you for your valuable suggestion. You may settle either at Bombay, Calcutta or Delhi for starting business of export and import.

1476 D.P., Gwalior—A good formula of nail polish appeared in July 1949 issue of Industry. Formula of disinfecting powder will appear in due course.

1477 S.S.S., Bharthana—For I. G. wax enquire of Calcutta Chemical Co., Ltd., 10, Bonfields Lane, Calcutta.

1478 T.N.R., Mathurai—Tablet making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. Thread braiding machines may be had of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta. You may use gum powder to impart glaze to the pills.

1479 N.P.C., Karur—For cycles enquire of the following firms: Oriental Import & Export Co., Hasham Premji Bldg., 441, Kalbadevi Road, Bombay; Wellington Cycle & Motor Co., 313, Hornby Road, Bombay; Bentinck Cycle Co., Ltd., 1-2, Chowringhee Road, Calcutta and Bimal Bros., 1B, Chowringhee Road, Calcutta.

1481 D.S.B., Bombay—For tannin extracting machine enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta and Volkart Bros., 8, Netaji Subhas Road, Calcutta. The above firms will supply you with estimates of factories to be started with their machine.

1484 R.S.M., Hamirpur—For cream separators enquire of Edward Keventers Ltd., 11/3, Lindsay Street, Calcutta. Tablet making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

1486 H A.A., Ijebu-ode—Your query is unintelligible.

1488 R.K T, Poona—For heaters and formers enquire of Bengal Potteries Ltd., 45, Tangra Road, Calcutta and Art & United Potteries, 9, Ezra Street, Calcutta. An article on candle manufacture appeared in May 1949 issue of Industry.

1489 G.J.K., Bombay—It is possible to manufacture ammonia synthetically. But in India it is not manufactured synthetically. Hydrogen peroxide may be manufactured with profit.

1490 A.R.M., Kumbakonam—Process of manufacturing fireworks will appear in an early issue of Industry.

1491 T.N.R., Mathurai—You may write to the Drug Controller, New Delhi.

1492 B.L., Calcutta—For adhesive tape enquire of R. G. Paul & Co., 110/2, Grey Street, Calcutta and India Trade Agency, 16-1, Shyama Charan De Street, Calcutta.

1496 R.D., Sorupeta—You may manufacture cast iron articles from scrap iron. For machines

you may enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta. Perhaps there is no factory in Assam manufacturing cast iron articles. For bucket making machines write to Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta. As regards literature you may consult Practical Metal Casting by D. De, published from this office, price Rs. 3-7 including postage.

1498 D.S.P.W., Muzaffarpur—You may use carbon black in place of lampblack. You may also use a bit blue colour.

1499 M.P., Allowli—Tin boxes may be had of Bengal Tin Box Manufacturing Co., Ltd., 1, Jadu Nath Mitter Lane, Calcutta and National Sheet & Metal Works Ltd., 36A, Sahitya Parishad Street, Calcutta.

1501 K.M.V.R., Madras—Refer your query to the Consul-General for Netherlands, Royal Insurance Bldgs., 27, Dalhousie Square, Calcutta.

1502 S.A.A., Uluberia—For whitening rosin you may use magnesium carbonate in place of plaster of paris.

1503 M.P., Banda—For torches and bulbs enquire of K. G. Maniar & Co., 55/1, Canning Street and Manick Bros., 69, Canning Street; both of Calcutta. Following is a list of importers: K. C. Dey & Sons, P31, Ganesh Chandra Avenue, Rajasthan Importing & Trading Co., 11, Armenian Street and Ray Brothers & Co., 81, Old China Bazar Street; all of Calcutta.

1504 T.D.N., Lahore—For kangy enquire of Banshidhar Dutt, 126, Khengrapatty Street, Calcutta.

1507 B.G.H., Karachi—For laundry machines enquire of Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta and Larsen & Toubro, Royal Exchange Place, Calcutta.

1510 V.G., Madura—For selling rare used stamps advertise in newspapers such as the Statesman of Calcutta.

1512 J.C.S., Darrang—For stoves write to Amar Nath Kundu & Brothers, 14/3, Old China Bazar Street, Calcutta and Madan Mohan Dhar, 50, Old China Bazar St., Calcutta. For lamps of required brand enquire of Ali Mohamed & Co., 24-27, Old China Bazar Street and Britannia Stores, 192, Old China Bazar Street; both of Calcutta.

1513 G.D., Chheharta—For button hole making machines enquire of Don Watson & Co. Ltd., 19, British Indian Street, Calcutta and K. C. Mullick & Sons, Ltd., 77-13, Dharamtala Street, Calcutta.

1514 B.N.N., Calcutta—For etching machines enquire of John Dickinson & Co., 6, Clive Row and Photographic Stores & Agency Co., Ltd., 154, Dharamtala Street; both of Calcutta.

1515 H.K.S., Cachar—For textile machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1517 S.C., Vizianagram—Following is the process of refining castor oil: Put castor oil to a clean iron boiler supplied with considerable quantity of water. Boil the mixture for some time and skim off the impurities as they rise to the surface, a clear oil is at length left upon the top of the water, the lage and starch having been dissolved by this liquid and the albumen coagulated by the heat. The latter ingredient forms a whitish layer between the oil and the water. The clear oil is now carefully removed, and the process is completed by boiling with a minute proportion of water, and continuing the application of heat until aqueous vapour ceases to rise and until a small portion of the liquid taken out continues perfectly transparent when it cools. The effect of this last operation is to clarify the oil and to render it less irritating by driving off the acid volatile matter. But much care is required to carry out this operation so that not to push the heat too far, as the oil then acquires a brownish hue and an acid peppery taste. After the completion of the process put the oil into barrels and send to the market for sale.

1519 S.C.G., Kanpur—Process of manufacturing tooth powder and vita oil will appear in Formula Section in due course.

1523 S.U., Calcutta—You may consult Industry Year Book and Directory published from this office.

1524 R.P.S., Patna—For tag making machines enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1525 V.C., Aligarh—For ear drum you may enquire of K. R. Lynch & Co., 113, Chittaranjan Avenue, Calcutta.

1530 P.B., Shikarpur—You better consult a lawyer.

1531 R.V.K.N., Coimbatore—Tin cans may be had of Bengal Tin Box Mfg. Co. Ltd., 1, Jadu Nath Mitter Lane, Calcutta 4 and National Sheet Metal Works Ltd., 36A, Sahitya Parishad Street, Calcutta.

1532 G.C., Banaras—To communicate with any querist write to him with number and initials care of Industry when your letter will be duly redirected.

1533 L.K., Delhi—Process of manufacturing hair dye will be found in Prospective Industries published from this office, price Rs. 3/7/- including postage. For machines enquire of Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta.

1534 H.L.V., Madhupur—The concluding stage in manufacturing white lead is carbonate of lead formed by action of acetic acid is crushed up in a mill and passed through a very fine sieve. This fine sieve will only allow the carbonised lead to pass through, not the bits of blue uncorroded lead. It is now mixed with water in a large tank fitted with agitators, and as it leaves this tank it is ground between hard stones. After being ground, it is floated successively over five or six troughs of water, so that impurities may settle. and nothing but the pure carbonate of lead can pass the last trough. It is then dried. The final process is to grind up the pure carbonate of lead with oil, to make the lead as the painter receives it to work with. For patch vulcanising you have to use raw rubber.

1536 J.A.B., Delhi—Following is a list of newspapers: Cape Argus, published from Cape Town; Cape Times, Cape Town; Natal Witness, published from Pietermaritzburg, Natal; Daily News, published from Durban; Natal and Natal Mercury, published from Durban, Natal. Refer your query to The Controller of Exports, New Delhi.

1538 M.I.S.W., Pudukottah—Process of glazing old galvanised sheets will appear in Formula Section in due course.

1543 M., Jammu—There is no such institution.

1544 N.F.C., Bombay—Crude asbestos is not washed for producing asbestos fibre. The act of separating the mineral from its matrix of rock is first of all sun dried on steampipe and then issued to cobbers to free it from rock particles. The cobbers flatten out the fibres striking them with cobbing hammers weighing about 3 to 4 lbs. each on cobbing tables which are provided at suitable intervals with a flat iron, or stone plate, 10 to 12 inches square. In this way an operator can produce as much as about one maund of fibre in course of a day. After having been subjected to this treatment the asbestos still contains a certain amount of dust and is not yet suitable for spinning. To separate the rock particles, dust and small fibres the mineral is now further crushed by passing through a set of stone rollers or, in a hammer mill, and the loosened material is then opened, or winnowed by blowing into a long wooden trough. During this operation the smaller and lighter fibres are blown towards the farthest end of the bin and the longer fibres are retained nearer to the blower. Iron, wood and other impurities have got to be picked up from the asbestos. Presence of these foreign bodies spoils the spinning properties of the mineral.

1545 V.S.R., Trichinopoly—Synthetic perfumes may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta. Soap colour may be had of Champalal Agarwala, 45, Armenian Street, Calcutta.

1548 K.P.A., Rampur State—For twine and wire nail making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

1550 N.K.S., Siliguri—You may try any of the various oils sold in the market and used as preventive for baldness such as Vitex.

1552 S.V., Lucknow—For coloured tin-sheets write to Bengal Tin Box Mfg. Co. Ltd., 1, Jadu Nath Mitter Street, Calcutta 4 and National Sheet & Metal Works Ltd., 36A, Sahitya Parishad Street, Calcutta.

1553 M.C.S., Yeola—For oil refining plant enquire of Mirrlees Watson & Co., 21, Grosvenor House, Old Court House Street, Calcutta and Volkart Brothers, 8, Netaji Subhas Road, Calcutta.

1554 S.N.H., Bhopal—Wire nail making machines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

1555 M.M.A., Lahore—Process of manufacturing hair dye will be found in Manufacture of Toilet Goods published from this office, price Rs. 4/7/- including postage. This book also contains formulas of all sorts of toilet preparations.

1556 N.K.C., Jamshedpur—For carbon papers enquire of Bharat (Sales) Ltd., 6, Mangoe Lane, Calcutta and G. Rogers & Co., 12, Dalhousie Square, Calcutta. For board enquire of India Paper & Board Mills Co. Ltd., 71, Satgachi Road, Dum Dum, Near Calcutta.

1559 C.R.P.L., Simla—For mustard oil flavour enquire of Ghose Bros., 50, Ezra Street, Calcutta.

1561 B.L.P., Nagpur City—There are two firms manufacturing oxygen and acetylene at Calcutta viz: Asiatic Oxygen & Acetylene Co Ltd., 8, Dalhousie Square and Indian Oxygen & Acetylene Co Ltd., 48, Diamond Harbour Road For starting the above business you have to invest at least Rs. 50 lakhs.

1566 M.D.B.R., Maddikera—For colour enquire of Champalal Agarwala, 45, Armenian Street, Calcutta.

1567 S.C.D.P., Saktipur—As regards chyabana-prash you may consult an ayurvedic physician. Radium treatment is undergone in case of a Cancer patient. For milking machine ensuire of Edward Keventers Ltd., 11-3, Lindsay Street, Calcutta.

1568 A.S., Calcutta—We have no book on watch repairing. You may however enquire of W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta.

1570 A.C C C., Udaipur—You may use spirit soluble red colour which may be had of Champalal Agarwala, 45, Armenian Street, Calcutta.

1571 L.C., Secunderabad—For oil milling machines enquire of Mirrlees Watson & Co., Ltd., Grosvenor House, Old Court House Street, Calcutta. Estimate for starting a mill with their machines will be supplied by the firm.

1576 N G, Akividu—You may consult Cotton Dyeing and Printing published from this office, price Rs. 3/7/- including postage. For yarn reeling machine enquire of W. H. Brady & Co. Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1581 D.M.S., Khamgaon—Process of manufacturing washing soap will be found in Manufacture of Soap published from this office, price Rs. 4/7/- including postage. Process of manufacturing lead pencil will be found in Industry Prize Articles 1944 published from this office, price Re. 1/15/- including postage. Soap making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

1583 E W.C, Madras—Reply to your letter has already been sent by post.

1585 J.K S., Miraj—For playing marbles you may enquire of Beri Stores, 99/1, Canning Street, Calcutta and Calcutta Sales Syndicate, 14/2, Old China Bazar Street, Calcutta.

1587 M.A.R., Agra—We are not aware of any institution where medical degrees of foreign countries are available.

1588 W.I., Poona—Detail regarding solvent extraction is not available. An article on solvent extraction of oil appears elsewhere in this issue.

1591 C.T.C, Calcutta—Trade mark registration is undertaken by some patent and trade mark agents. You may however negotiate with A. Mitra & Co., 5/2F, Raja Rajballav Street, Calcutta.

1593 P.E.W., Bulsar—Following is the p cess of manufacturing artificial wood. Ve fine boards can be made from 59 per cent. sa dust and sorel cement. They are cast on gla and so have a smooth polished surface. Ve pretty effects can be obtained by colouring t sawdust particles. Such boards should prove good substitute for asbestos boards, and cou also be used to replace plywood in furnitu making, and especially in office fittings.

1595 S.C.D., Pithapuram—Books on tab making may be had of W. Newman & Co., Lt 3 & 4, Old Court House Street, Calcutta. S crose is ordinary sugar which contains a sm percentage of water. You may negotiate wi sugar mills for your requirement.

1596 S.C.D, Pithapuram—For glass phi enquire of Modern Scientific Glass Works, 1 Radha Bazar Street and National Glass Blo ing Concern, 9, Nayan Chand Dutt Street; bo of Calcutta.

1598 S G.R.S., Thirunelveli—For dry wa ing velvet you may use benzene or petrol.

1599 C C I, Mathura—For mantle knitti machine you may enquire of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, C cutta. We are not aware of any chemical f mula of beeswax.

1600 M.M.V, Bhavnagar—Wants to be p in touch with the suppliers of hair clip shai ening tools.

1601 G K P, Kottarakara—In silveri mirror two solutions are required namely r ducing solution and silvering solution. Redu ing solution · In 1 oz. of distilled water dissol 12 gr. of Rochelle salts, and boil; while boili add 16 gr of silver nitrate dissolved in 1 oz. distilled water and continue boiling for minutes more, then add more distilled water make 12 oz silvering solution. Dissolve 1 of silver nitrate in 10 oz. of distilled wat then add liquid ammonia until the brown p cipitate is nearly, but not quite, all dissolv then add 1 oz. of alcohol and sufficient water make 12 oz To silver take equal parts the two solutions and mix thoroughly, and l the glass face down on the top of the mixtu while wet after it has been carefully clean with soda and well washed with clean wat About 2 dr. of each will silver a plate 2 inch square. The dish in which the silvering is do should be only a little larger than the pla The solution should stand and settle for 2 o days before being used and will keep good f a long time.

—REVIEW OF BOOKS

ELECTRICAL ACCIDENTS. Published by Harsha Printing and Publications, Puthur, S. Kanara, Madras. Pages 136, price Rs. 3/8/0.

Electrical accidents are frequent in India The principles underlying the safety measures are simple enough and generally known to our engineers, and electricians, but a knowledge of the practical implications and the necessity for attention to details, seems to be lacking among common people.

On account of repeated mishaps it is considered that a systematic knowledge of the safety measures should be propagated. Now that there is a move for greater use of electricity, propagation of the precautionary and safety measures is all the more necessary.

From this view point "Electrical Accidents" will remove, one of our gravest drawbacks. This booklet attempts at a fairly simple and yet comprehensive explanation of how electrical accidents are caused and how they can be avoided and what should be done in case of accidents.

This book is mainly intended for young technicians and engineers. The main sources of danger and the possible precautions, have been indicated in Chapters III., IV. and V. Chapter III. deals with electrical accidents in the home and outside. Chapter IV. deals with electrical accidents in industrial establishment. From the viewpoint of electrical accidents industrial establishments are found to possess certain striking peculiarities which distinguish it from domestic premises. The exact nature of accidents that takes place in business establishments premises has been described in detail in this particular chapter. Chapter V. of this book describes electrical accidents in supply undertakings. Chapter VII. describes positive instructions in case of accidents and also describes with graphic details the artificial methods of respiration.

Now that use of electricity is fast spreading all over India, it will one of our primary concerns to follow these safety and precautionary measures in order that similar accidents may be minimised to a considerable extent.

BRITISH COTTON TEXTILE INDUSTRY. Published by Mr. B. B. Joshi, for the Technical and Commercial Publications, 81, Alakapuri, Baroda. Pages 210, price Rs. 4/8/-.

The Planning of British Cotton Textile Industry is a storehouse of illuminating information about this premier industry in Great Britain. The inspiring pages will show clearly what lies at the root of the greatness of this industry. The grand organisation and the internal efficiency of administration mainly account for her real greatness in this particular sphere.

Apart from the intrinsic importance of the subject itself, the book has a significance and meaning for India. Indeed there is much, India can learn from the plan of the British Textile Industry in the matter of modernising of plant and equipment, improvement of organisation, training of operations. If we, too proceed on similar lines, we will, in all probability, achieve the desired objective in textile industry.

The book is mainly intended for those who are desirous of entering upon this profession. As such, it will hardly interest laymen who have neither the inclination nor the aptitude for this line. A few chapters, say the chapter on "U. K. Textile Machinery and Processes" are so full of technicalities as to be unintelligible to the average readers. Still, a few chapters there are, which the average readers will not find difficult to appreciate. As for instance, the chapters on "Recommendation by various committees for the post-war reconstruction" "Trade Union and Labour Management" wages in British Cotton Trade—are within the easy reach of average intellect.

Judged as a whole, the book will prove useful to those interested in this line.

NOTICES & REVIEWS

(Manufacturers sending speciments and samples of their products for notice and review may please note that no notice is published of medical preparations and allied substances in this sections.)

A NEW MONTHLY

We are glad to receive a copy of "Coal & Commerce", a new monthly exclusively devoted to coal industry. Its main object is to focus the attention of all concerned to the problems of the coal industry. In the present issue under notice are included a series of informative articles, such as Coal Position in India, Some Aspects of India's Coal Mining Industry, India's Foreign Trade Position, etc. We wish the journal every success. It is published from B/1, Odeon Building, Connaught Place, New Delhi.

TRADE ENQUIRIES

(To communicate with any party write to him direct with name and address given below mentioning Industry).

1420 Gulshan Trading Co., 21/3, Railway Colony, Kishan Ganj, Delhi—Want to be put in touch with dealers in Goa broom sticks at Calcutta.

1426 S.A., Sayed, 66, Evening Bazar, New Market, Bangalore City—Wants to be put in touch with spirit level manufacturers.

1463 Mrs. N. Fernandes, 19, Frere Road, Kirkee, Poona—Wants to be put in touch with the manufacturers of pineapple juice or growers of pineapples in Madras or Singapore.

1521 B.V.V., Narayana Doss, Thimmapuram, Dwarka Thirumala, Ellore Tq., W. Godavari—Wants to be put in touch with the dealers in human hair.

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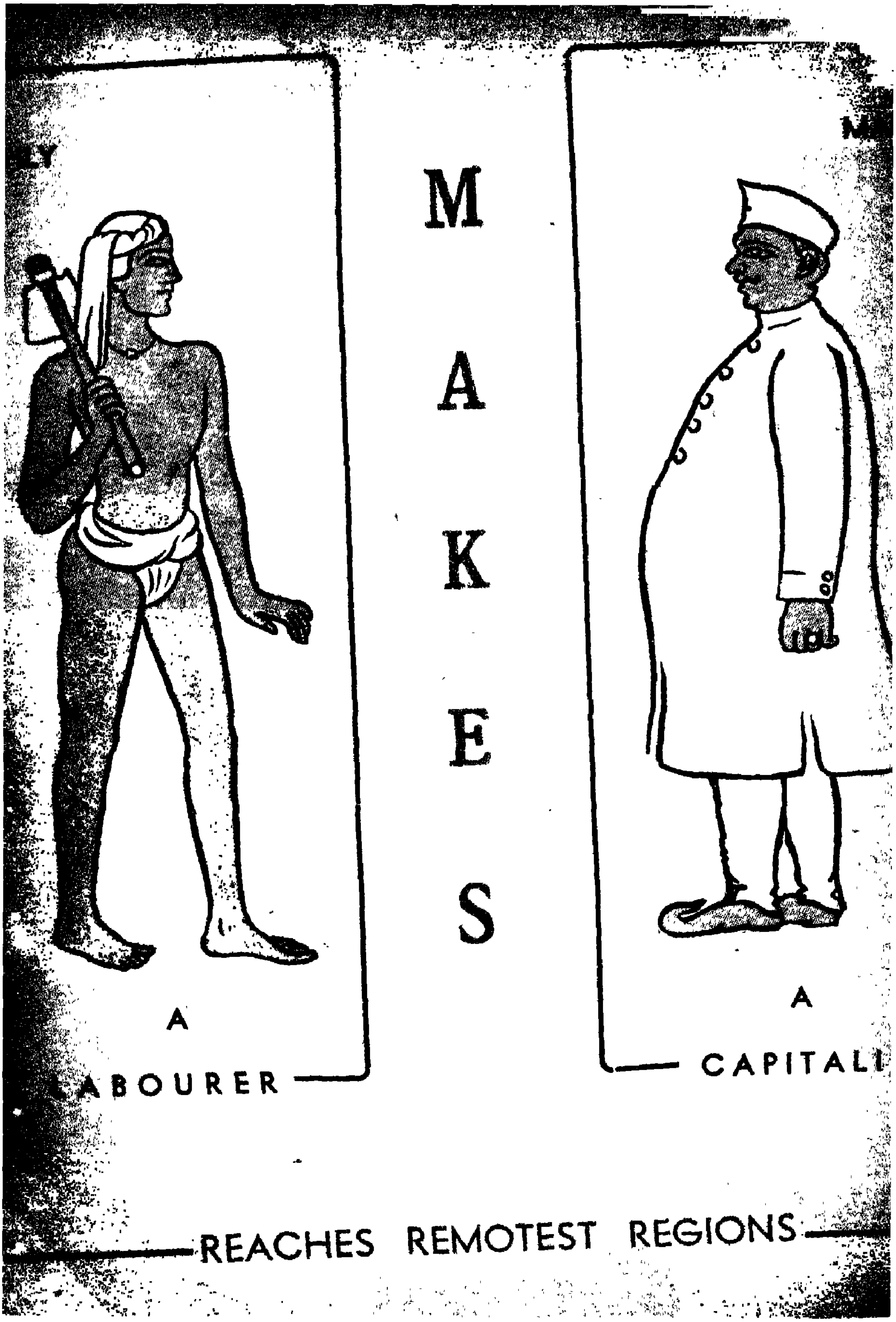
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MONTHLY MAGAZINE FOR MANUFACTURERS & BUSINESSMEN

VOL. XL. CALCUTTA, SEPTEMBER, 1949. No


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INDUSTRY.

A Monthly Magazine for Manufacturers and Businessmen.

Published in the first week of the month by INDUSTRY PUBLISHERS LTD., 22, R. G. Kar Road, Calcutta-4.

EDITORIAL CONTENTS FOR SEPTEMBER, 1949

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All enquiries regarding industrial or business information should be addressed to the Editor. Contributions and articles for review and notice should also be sent to him.

All enquiries regarding the Subscription or Advertisement Departments should be addressed to the General Manager.

OFFICE HOURS.

Editorial Department: 11 A.M. to 4 P.M. on weekdays and 11 A.M. to 2 P.M., on Saturdays.

Subscription and Advertisement Department: 10 A.M. to 5 P.M. on weekdays and 10 A.M. to 2 P.M. on Saturdays.

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Wanted Travelling Canvassing Agents & Customers on Liberal Commission Basis, for Bhavani Carpets & Carpet Bags Apply to:— The Ganesh Industrials Carpet Manufacturers, Bhavani, P.O. Via Erode, S. India. 945 AA

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Wanted Agents in each city to sell our washing soaps, terms very liberal, apply to the managing director, Saraswati Vegetable Oil Mills Ltd., 428, Kalbadevi Road, Bombay 774 AA

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A few Sole Distributorships in foreign countries invited for our famous "Hand Brand Hair Dye" to cope with its growing demand in the world markets. Applicants should mention experience and present representations if any: to H. B. & Co., Post Box 476, Calcutta. 701 AA

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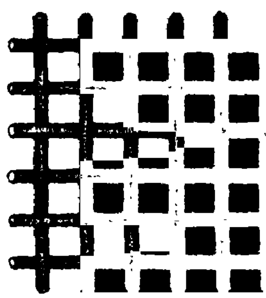


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Industry

EDITOR:
K. N. BANERJEE.

VOL. XL CALCUTTA, SEPTEMBER, 1949. No. 474.

INDUSTRIAL EXHIBITIONS

IN an industrially backward country like India there is a great psychological need to make the people industry-conscious, a need which hardly can be fulfilled by any amount of theoretical precepts. Where sermons fail, practical demonstration by and through properly organised industrial exhibitions will serve the purpose in an effective manner.

The educative value and the immense possibilities of industrial exhibitions being fully taken into account, it will be appropriate to set them up as permanent institutions rather than as temporary nine-day shows.

The exhibits must necessarily include samples of manufactured products, but more emphasis should be laid on the technical and technological aspects of industries,—the processes of manufacture and the plants and machineries used in this task. What distinguishes a Commercial exhibition from an Industrial one is the stress on technicalities in the latter variety. To make exhibitions more and still more educative they may be made to include sections dealing with labour welfare, sanitation and other social and humanitarian problems of the modern industrial life.

Besides helping to develop industry-mindedness, exhibitions have a more concrete role to play as the medium through which the exhibits become known to the public. This spells benefits for both consumers and manufacturers. Also, from exhibitions showing where our industries stand, all concerned may take heart and feel inclined to go energetically about into the work of removing the existing drawbacks at least to a perceptible extent.

It may well be that India is already turning out plants and tools and other mechanical industrial equipments for the supplies of which most men here feel like looking westward almost as a convention. A recent industrial exhibition held in Coimbatore under Mr. G. D. Naidu's lead, proves convincingly that India's capacity to solve her industrial equipments problem is not at all disappointing. South India's Nuffield,

(Continued on page 284)

DOLLAR CUTS ACCEPTED

At the Commonwealth Finance Ministers' Conference, held in London in July last, all the participants took the unanimous view that there was an urgent necessity to reduce the imports of their countries from the dollar area to overcome the financial and economic crisis resulting from their fast dwindling resources of gold and dollars. The Conference, therefore, suggested that the participants should recommend to their respective Governments an immediate dollar cut equivalent to Britain's 25 per cent., earlier decided upon. No doubt rigid conformity to this request would spell great inconveniences to backward countries like India, Ceylon and Pakistan, all three of which can hardly afford to dispense with imports from the dollar area to the extent recommended in London. Besides all sorts of machineries and capital goods they need for a successful implementation of their development plans, the three new States need to import food from the dollar area to enable them to liquidate its shortage now being keenly felt. In this context India seems to have taken a very courageous decision in agreeing to cut her dollar expenditure by 25 per cent., for the time being, provided all other countries of the Commonwealth follow suit.

Some in our country have tried to create a wrong impression that Britain deliberately chose to cook up the story of dollar crisis in order to bolster up her own export trade with the sterling area countries. The figures available so far give the lie direct to such apprehensions. At the beginning of 1949, the dollar reserves stood at £458 m, but on June 30, 1949 they stood at £406 m only. Dollar expenditure going on at the previous rate, it would have been no surprise, if the entire resources had got exhausted completely within the next twelve months or so. It was this fact that compelled the British Chancellor of the Exchequer to consult the Finance Ministers of other Commonwealth countries. The 25 per cent. dollar cut recently recommended is no more than a tentative measure. It is also a negative remedy, while the Commonwealth countries will have to export substantially to the dollar area to replenish their dwindling dollar reserves.

Speaking of India's case in particular, it may be pointed out that, provided we have to reduce our imports from the dollar area, we should insist upon a supply of our requirements in food, machinery and technical skill from the sterling area. Britain and other industrially progressive countries of the sterling area should go upon the principle of equalitarian treatment of all members of the Commonwealth. Also, to be able to carry on export trade with the dollar area India will

(Continued from page 233)

as Naidu is popularly known, has shown beyond doubt that India can make it all,—from motor cars, radio sets, electric motors down to robots and shaving blades.

An exhibition, such as the one above referred to, is at once an achievement and an incentive to greater and more achievements. Publicity-shy Naidu comes into his own through it, but most surely he benefits the nation more than himself.

have to sell her products and raw materials at rates which should not exceed those other countries can offer. It will never be possible for India to come out successful in this direction, unless she can reduce her cost of production. An all-round economy and cuts in expenditure seem the most urgent need of the hour and let us hope the Government of the country will be prepared to set the ball rolling in the proper direction.

INDO-BRITISH STERLING PACT

The main features of the recent Indo-British Financial Agreement are as follows:—

Sterling releases to the tune of £81 m to cover drawals in 1948-49; £50 m each for 1949-50 and 1950-51 in the place of £40 m each as agreed to earlier; and an additional sum not specified to pay for import orders placed in 1948-49.

Under the new agreement India will receive from the Central Convertible Sterling Pool 84 m dollars, representing overdrafts, and a sum of 140 m dollars to cover the gap between her imports from and exports to the dollar area in the current year.

At the recent Commonwealth Conference of Finance Ministers held in London it was decided to admit India to all the rights and obligations of full membership of the sterling area with the result that the quantitative limitation on her right to draw hard currency from the Central reserves has been removed.

The releases secured in terms of sterling and dollar as stated above, will not evoke much enthusiasm anywhere. But at the same time all sober thinkers will realise that in the stringent or rather critical financial conditions now prevailing India could hardly expect a better deal.

Finance Minister Dr. Matthai has rightly emphasised that India's newly acquired privilege of unlimited drawals from the Central reserves of hard currency is governed by the corresponding obligation of adding her mite to the same by increasing her export trade with the dollar area. Dollar earning through exports to the dollar area is easier said than done especially when the U. S. A. is in the grip of a boom crisis and business recession.

There has been much careless talk of late about Britain's unwillingness to repay her debts to India and about "dollar imperialism". Such muddled thinking simply helps to antagonise those whom we would like to befriend us in this hour of fast approaching crisis. Dr. Matthai's cheerful bearing and his readiness to co-operate with like-minded nations in common efforts to undo a common financial crisis seem a very welcome contrast to thoughtless impatience whipped up in certain quarters.

There is no doubt that the key to the ultimate resolution of the difficulties resulting from dollar shortage in all the Commonwealth countries lies in the U.S.A's. hands. And the U.S.A. too cannot be expected to do anything in a huff. So reduction of dollar expenditure is the only immediate practical method of tiding over the present crisis, even though this is no solution but some kind of a temporary palliative. Dr. Matthai was quite outspoken in his talks with Pressmen last month, about the need to conserve foreign exchange. He pointed out that, though India had been able to secure a more liberal release of dollars and sterling under her latest agreement with Britain, it would be wrong to think she had acquired thereby the right to spend as she pleased. During the next few months India should be prepared to agree to

drastic cuts of all her non-essential imports from abroad. Dr. Matthai also gave the assurance that India would do all she could to maintain the stability of sterling. This is necessary in her own interests, for being a holder of a large sterling balance with the Bank of England, India is bound to lose heavily in case of devaluation of the pound.

At the time of writing it appears that steps are being taken to conserve India's resources of foreign currency. The petrol ration, for example, has already been reduced. This means that in the coming few months India will import much less petrol than she needs normally. It is anticipated that similar cuts will be extended to other imports from outside, the dollar area, in particular. A far more convincing evidence of India's intention to toe the Commonwealth line in economising dollar expenditure is provided by the report that India will introduce for the first time a foreign exchange budget for 1949-50. The budget will state systematically what the things she needs to buy from foreign countries and what she may hope to export. These estimates will relate to both soft and hard currency areas. As regards imports, topmost priority will be given to food, and, let us hope, to agricultural machinery too without which India will find it altogether impossible to realize her latest ambition to make the country self-sufficient in respect of food by the end of 1951.

INDUSTRIAL RESEARCH

Industrial Research, as a special type of scientific research the fruit of which can be made over to industries for utilization for their development, is receiving welcome attention in this country at the present moment. The Council of Scientific and Industrial Research is taking a considerable interest in the matter of facilitating commercial exploitation of results of research carried out by scientists. The Council, with this end view, has recently proposed the formati of a National Research Development Co poration and the erection of pilot plan in the national laboratories. It is said th "the primary object of the proposed Co poration will be to give new process developed in India a try-out on a sem commercial scale," and thus to encoura the industrialists to undertake the urge work of industrial development in tl modern scientific manner. The object erecting pilot plants in the national lab ratories is to establish closer liaison b tween the Council and the industries ar to enable them to utilize the researches the Council. There is no doubt that, and when the above recommendations the Council are implemented, a sufficie fillip shall be provided to our industries rehabilitate themselves in a satisfacto manner.

Among other recent recommendatio of the Council of Industrial Researc particular mention may be made of thos relating to the setting up of a full divisio of Central Drug Research Institut Lucknow, for undertaking botanical re search on indigenous drugs. The Govern ment have been asked also to conside two projects, one costing Rs. 23 crore and the other costing Rs. 40 crores, for th manufacture of synthetic petrol. The pro jects in question were prepared by Ame rican experts. In this connection th Council has proposed that pilot plant in vestigations on the synthesis of petro from coal may be carried out to India.

EXPANSION OF JUTE CULTIVATION

Ever since the partition of the countr India's jute industries have been finding i difficult to procure their requirements o raw jute at an economic price. The fac

is, that while India has jute mills and little raw jute, Pakistan does not have any jute industry even though she enjoys a virtual monopoly in the production of jute. It is good that India made a realistic approach to her problem of shortage of raw jute and undertook at an appropriate moment an expansion of her jute cultivation. As a result of this drive, jute is now being grown in several parts of the country including West Bengal, U.P., Orissa, Travancore, Madras and Bombay. The recent closure of Jute Mills in and around Calcutta for one week in every four weeks, is not, however, due to any shortage of raw jute but to the dwindling facilities of marketing the finished product. A drive to produce more and yet more jute may bear fruit in two directions. It may help the jute industry to lower the cost of production without securing which it can hardly meet the competition in foreign markets offered by paper and other substitute products. And secondly, even if the Indian Jute Mills fail to utilize in full the raw jute produced in this country, we may hope to export the surplus to earn foreign currencies of which there is a perceptible shortage here at the present moment.

Meeting in Calcutta some weeks ago, the Indian Central Jute Committee decided to make a provision of Rs. 30,000 in this year's budget estimates for subsidising the scheme for extension of jute cultivation in the U.P. The jute crop is sometimes laid waste by pests and diseases peculiar to it. The attention of the Central Jute Committee has been drawn to this menace in order to combat which it has decided to set up a Jute Pest and Disease Control Centre at Tarakeswar (West Bengal). Also, the Jute Agricultural Institute has been directed to make a comprehensive survey of the acreage, yield and quality of *Mesta* fibre grown in different parts of the country. This fibre, it may be noted, can be mixed with raw jute for utilization in the manufacture of finished jute products. Yet another important problem which has received the attention of the Central Jute Committee is the recent decline in the price of raw jute. If the evil continues unchecked for some time yet, the producers may be forced to abandon jute cultivation and turn to food and other crops that might fetch a higher price. The Central Jute Committee, therefore, has asked the Government to take early steps to implement the recommendations of the Prices Sub-Committee of the Krishnamachari Policy Committee on Agriculture, Forests and Fisheries. The recommendations under reference related to the fixation of maximum and minimum prices of agricultural products, making allowances for the normal trade differentials, storage charges, and the market fluctuations in supply and demand.

TECHNOLOGICAL INSTITUTE FOR MADRAS

The Premier of Madras recently opened at Chrompet (Madras) a new Institute of Technology based on the model of the Massachusetts Institute. This is an important event in this country's industrial field in as much as a proper functioning of such institutions will considerably speed up the training of technical personnel of which there is a great dearth here. Indian industries to-day are facing two main hurdles, viz., scarcity of indigenous capital and a lamentable shortage of properly trained technical personnel. The present National Government of the country seeks to overcome the first difficulty by inviting the increased participation of foreign capital in business and industrial undertakings in India. But this by itself will fail to usher in a new industrial age in India, if simultaneous efforts are not made to impart sound technological training to the workers who will man our industries. In this context an institution like

the Madras Institute of Technology seems a welcome augury for our future economic progress. We wish the new venture complete success and hope more such technological training colleges will be opened in other parts of the country. The running of such institutes is undoubtedly a very costly affair, but the present position of India is such that we cannot afford not to think big. The Madras Institute, it is reported, will impart both practical and theoretical training in five faculties, viz., Electronics, Instrument Technology, Automobile Engineering, Aeronautical Engineering, and Motion Picture Technology. Training in the last subject will be postponed for the time being to permit the Institute to stabilise itself before any further expansion is undertaken.

COIMBATORE INDUSTRIAL MACHINERY EXHIBITION

While attempts are being made to step up production on all fronts, the Indian public had been long on the look-out for industrial machines on which they could lay their hands to start manufacturing industries without any further loss of time. The Industrial Machinery Exhibition organised by Sri G. D. Naidu, the industrialist-inventor of South India, did not come a day too soon and awakened wide interest among all intending manufacturers. A large number of industrial machines of various types and tools, both of Indian and foreign make, were on display. Machines and appliances invented by Sri Naidu, the Edison of India, were the centre of attraction. The most interesting feature of the Exhibition was its educational side. Arrangements were made for regular demonstration of the working of the machines and explanation of the principles on which these machines work. In opening the Exhibition Sri K. N. Banerjee, the Editor of Industry, laid great stress on the holding of such exhibitions in all parts of the country and on presenting on view before the public the range of machinery available for immediate use. This will no doubt make India more industrially bent and will bring about an advance in production which we all desire in the greater interest of the the country.

—MANUFACTURE OF CUTLERY I

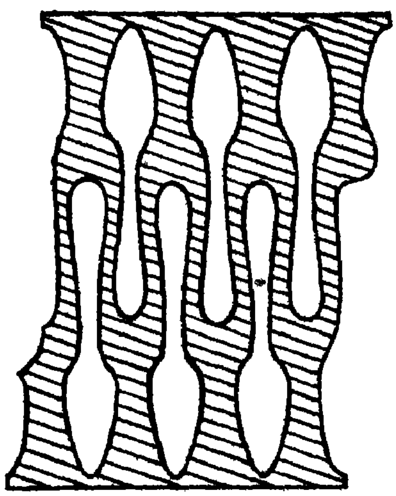
By V. L. N. Row, B.Sc., (Engg.), A.M.E. (Ind).
(E. I. R. Workshops, Jamalpur) & formerly of
the Indian Cutlery Mfg. Co. Ltd., Calcutta.

PRIOR to the last World War most Indian manufacturers used to make spoons and forks with brass which were nickel plated subsequently. Also many people used to make these with the so called nickel-silvers which hardly contained even 5% of nickel. But the best English made cutlery is required to be made of nickel silver of B.S.790 grade which contains at least 90% of nickel. Most of the foreign made E.P.N.S. cutlery conform to this specification.

The nickel silver used is of varying proportions, nickel being of course the primary basis metal. This metal is employed principally because of its white colour closest to that of silver than any other metal, or alloy.

CASTING:

The constituent metals are nickel, copper, and zinc, and at least 33⅓% of the melt should be virgin metal. The melting is carried out in plumbago pots, usually in coke fired furnaces, with a good draught, hard coke of the best quality being used. Rapid melting is essential, 112 lbs. metal taking about 1½ hours. The pot should be covered during melting with a suitable flux such as a mixture of borax and boric acid, which is necessary to prevent gas absorption, with consequent porous castings. This could also be produced by slow heating. Before the metal is poured out a suitable deoxidising agent like manganese copper should be used. This manganese deoxidiser contains 30% manganese and should be added at the rate of 5-6 oz. per cwt. of metal. When the temperature is approximately 1200 deg. Centigrade after skimming off the slag, the metal should be poured out preferably through a pouring head or tundish. The pouring must be done quickly and continuously. The moulds into which the metal is poured are of cast iron, which should be warmed and covered with a non-volatile dressing such as a mixture of rape oil and charcoal. The surfaces of the moulds should be smooth and free from cracks, otherwise it will be necessary to place the ingot faces before rolling.



1. Sheet after Blanks are Cut.

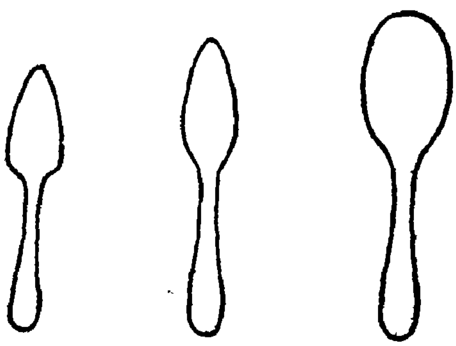
Impurities must be strictly controlled and should not exceed under ordinary circumstances even 0.3%. Sulphur is particularly detrimental, but traces will be taken care of by the manganese deoxidation. Iron in particular should not exceed 0.½%, as this increases the hardness and reduces the malleability. Oxides give rise to a spilly metal which will cause great

trouble in the manufacturing process and during the polishing and plating operations.

The colour of the metal is controlled entirely by the nickel content, and next to nickel zinc has also considerable effect. Plated nickel silvers usually contain only 10-15% of nickel while unplated stuff contains upto 20-25%. Here are some typical compositions adopted by manufacturers for nickel-silver cutlery:

Nickel %	10	12	20	25
Copper %	65	63	60	55
Zinc %	25	25	20	20

When the metal has cooled down the ingot is removed from the mould and the top two or three inches which usually contains the impurities is cut off.



2. Cut out blank. 3. Strengthened blank. 4. Partly cross rolled.

ROLLING

The next operation is of rolling into sheets of correct gauge and width. This is only cold rolling that is adopted, and an ingot of 1¼" thickness may require something like 24 passes before it is reduced to ¼" thick. During the process of rolling the metal must be frequently annealed in muffle furnaces at a temperature of about 700 deg. C. Prolonged annealing produces excessive grain growth causing a rough surface when the metal is subsequently worked. After annealing, the metal must be pickled clean in 10% sulphuric acid with the addition of 1 lb. sodium bichromate per gallon. The scale is quickly removed if the temperature is maintained at 50 deg. Centigrade. After pickling the sheets must be inspected to ensure that no scale remains, as any scale rolled in during subsequent passes of the rolls will give rise to insurmountable trouble in the polishing shops. After rolling, the next process is stamping.

STAMPING

Production in drop stamps is the oldest method ever known and it briefly consists as follows. The final thickness of the rolled sheet should coincide with the thickness of the centre of the tail of the article to be made. This is then cut into strips of the desired width, which are then cross rolled at each end on open ended steel rolls, to the gauge necessary for the thickness of the spoon bowl and stale end. Forks are cross rolled at the stale end and prong end. The blanks must be annealed, pickled and bright dipped in aqua-fortis after cross rolling. They are then cut to shape singly in a blanking press, and forks have their prongs pierced, leaving a protecting bar across their ends, before passing to the drop stamps. These may vary in weight from rope pulled hammers of 30 or 40 lb. to automatic hammers of 4 cwt. according to the amount of work required on the blank, the height of blow varying form 1 to 5'. The stales are stamped first; forks are then pronged and bent in one operation, while spoon bowls are dished in steel top and bottom dies and finally bowled using a steel punch in a zinc bed.

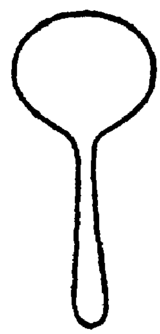
PRESSING

An alternative method to pressing, is stamping and the modern trend is towards friction screw presses. In this case the final pass of the rolls produces a sheet whose gauge corresponds to the thinnest

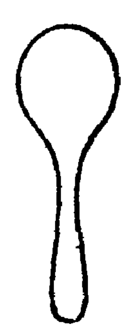
portion of the stales. The sheet is then sheared to the exact width necessary to pass through the blanking press, and the tools used in this press are designed to cut out 2 blanks with each stroke. The next operation is to thicken the middle of the stale by slighly reducing its width. This operation is performed in a friction press of about 40 tons pressure. Forks then have their prongs pierced again leaving a protective bar of metal across their ends. They are then ready for the final friction press operations. Spoon blanks however, must be rolled out to give the desired gauge and width of the bowls. This rolling is carried out in two stages to avoid risk of cracking the metal, with an intermediate anneal, pickle and bright dip. The rolling is carried out on rocker rolls which make use of hardened steel rolling blocks. The advantage of these over the older type of cross rolls is that these blocks can be shaped to the exact contour required, and being interchangeable, can be kept in a highly polished condition. This latter point is of greatest importance as owing to the great pressure exerted any marks or blemishes on the rolling blocks would be imparted to the blanks.

The spoon bowls are next clipped to shape in a small power press, and the flat blanks then pass to the friction presses. These presses make use of steel top and bottom dies each of which carries the exact impression to be imparted to the blank. The stales are pressed first, followed by the dishing and bowling operations, or in the case of forks, by the pronging operation, which also bends the prongs to shape. It is not usual to anneal spoon blanks after the final rolling, so that they are hard and springy, thus two operations are necessary to bring the bowl to its desired shape without puckering. If puckering does occur it means that, either the bowl has been rolled to an incorrect thickness, or the dies are not bearing correctly. It is important that the punch (top die) should find its beating round the edges of the impression in the bottom die and there should be no bearing between the centre of the punch and the centre of the bottom die. It is usual for the staling impression and the pronging or bowling die impressions to overlap slightly for a distance of an inch along the stale and it will at once be seen that this portion of the stale has a tremendous amount of cold working.

Dies for use in friction presses are made from 1% carbon steel while drop stamp dies, which are usually made from forgings having tapered sides, contain 0.8% carbon. Their hardness for either production method is of the order of 61 on the Rockwell scale.



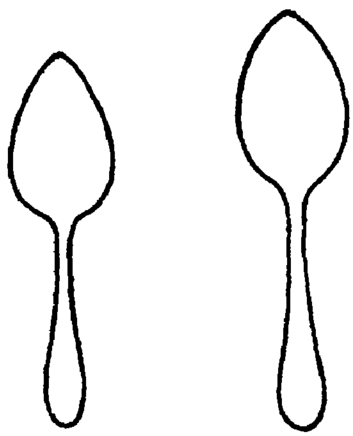
5. Rolled out.



6. Bowl clipped.

Both the methods have advantages as well as disadvantages. The sharp blow of the drop stamp is superior to the squeeze of the friction press, when the dies have to impart an intricate pattern, but for plain work, the friction press gives a stronger, more accurate, and smoother blank, which is very easily polished. Furthermore, if the die feces in a drop stamp were allowed to meet, the continual sharp impact would very soon ruin them.

In consequence, there must always be more metal in the blank than will fill the dies, so that after stamping the blank has a fillet of metal round it which must be removed. In the friction press, however, this condition does not apply; it is possible to so design the dies that there is the correct amount of metal to fill the die impression exactly with very little or no pressing scrap; in fact, an excessive amount of scrap would cause the dies to burst. Another factor favouring the retention of drop stamps is an economic os the initial capital outlay being but a fra tion of the expense of friction scre presses.



7. Stale pressed.

8. Finished spoon ready for plating.

The makers' name or mark can be c into the die. but it is more usual to impre this, using a steel punch in a handpres The article must be bedded in the die in which it was produced, otherwise, tl operation will cause a bulge on the fro of the stale. The flash round the edge which should have been kept to a min mum, is next removed on a rubber bond bauxilite wheel 12" dia. run at 1500 r.p. and bowl edges are struck off flat. Tl resultant edge should be as smooth possible, but it is necessary to strike balance between what is desirable a what is economically feasible. The b which was left across the prong ends the forks for protection during the pre sing operations is now cut off, and a th wheel 12" dia. and about 0.1" thick is r down between the prongs, which a afterwards pointed on the same wheel. suitable wheel for this operation has grade and grit of A 80 P.R. and is run 1700 R.P.M. Patterns having a very d corative outline are usually hand filed.

—TOILET POWDERS

TOILET powders to-day form one of the staple products of the perfumers' art. There are many things which contribute to the success of a toilet powder, of which, of course, the perfume is by far the most important. Whilst the question of colour is merely one of taste, which is easily adjustable, the fineness of the powder and the capability of adhering to the skin are of the highest importance. It cannot be too strongly emphasised that the powder base itself must be able to pass through a 120-mesh sieve and be free from any suspicion of grittiness. The principal vegetable product used in the manufacture of toilet powders is tarch. Talc, kaolin, boric acid, zinc oxide, kieselguhr magnesium carbonate and salts of bismuth are amongst the principal mineral constituents, and zinc and magnesium stearates are both used to a considerable extent. In toilet powders described as "violet powder", and powdered orris root is almost invariably employed. The most favoured type of starch is that prepared from rice, but maize starch is also employed to a considerable extent. An exceedingly good powder may be prepared from either of the following furmulas, which, of course, are capable of very wide variations, according to taste.

CHARACTERISTIC OF A GOOD FACE POWDER

The most necessary characteristics of a good face powder are:—

(1) Perfect adherence to the skin.

(2) Fineness of texture and even mixing.

(3) Colour.

(5) Perfume.

Adhesive properties are possessed by both zinc and magnesium stearates, kaolin, and kieselguhr, and all face powders should contain at least one of them. The premier place is undoubtedly occupied by magnesium stearate, and it may be used not more than 10 per cent.

Finest of texture is only obtained by grinding the ingredients to a very fine state of subdivision and then putting them through silk of at least 100 mesh.

Colours are always rubbed down in a mortar with some of the ingredients before machining, and sifted twice to make sure that subdivision of the basic pigments has been accomplished.

Perfumes are generally added to either light magnesium carbonate or kieselguhr after they have been marked. The dry powder is resifted twice and stored. When required a known quantity is weighed out and added to the other ingredients in the mill. Another method consists of spraying the liquid perfumes to the powder as it falls through the silk sifter. The amount of perfume used should be reduced to a minimum, and delicate rather than strong odours are the order of the day.

PROCESS OF MANUFACTURE

In making toilet powders the first thing necessary is to grind the solid ingredients, pigments and colours separately to an impalpable powdery condition.

For this purpose the big lumps are broken into small pieces and then subjected to the grinding operation. They are then subjected to sifting through sieves of 100 to 120 mesh so that the powder may be fine and uniform.

Mixing of perfumes with toilet powders demands considerable care. The common practice of the perfumers is to

macerate the perfumes with three-fifths of any of the absorbent powders, preferably with light magnesium carbonate in a mortar or mixing machine. The mixture is rubbed through a hand sieve with a stiff bristle until the perfume is evenly distributed in the mass. The perfume is then allowed to mature in light bins for some days.

Perfumes may also be added by spraying the liquid perfumes on to the powder as it falls through the sifter. The amount of perfume used should be reduced to a minimum.

The colours to be mixed in the toilet powders are first powdered as mentioned before. These are then mixed well with the balance of the magnesium carbonate or any absorbent powder and rubbed through a hand sieve with a stiff bristle till the colour is evenly distributed and a portion rubbed on a white paper shows no colour flecks.

To make the powder, now proceed to weigh out the specified quantity of the other ingredients and have them well mixed. The perfumed mass is then mixed in and then the coloured mass. Mix the whole lot intimately and sift. Store the finished product in tight boxes for a fortnight.

Care should be taken that the different ingredients for the powder mass are mixed intimately together. When working on a small scale, powders may be mixed softly on trays or marble slabs with spatula or in a mortar with a pestle. Hand driven mixers may also be employed for the purpose.

When big batches are to be handled, mixing is generally done in power-driven mixers which can handle, say, 100 lbs. of mass in 4 hours.

Pebble mills with porcelain-lined drum also yield fine powder. In this case the colour base need not be made at all. All the ingredients may be taken together for milling. Time for milling runs to 6 hours. Pebbles should weigh six times the weight of the powder taken.

I.

Rice starch	1000	parts.
Maize starch	500	,,
Zinc oxide	250	,,
Boric acid	50	,,
Talc	100	,,
Zinc or magnesium stearate	50	,,
Perfume	q.s.	

II

Rice starch	1000	parts.
Maize starch	400	,,
Magnesium carbonate	400	,,
Magnesium stearate	60	,,
Powdered orris root	100	,,
Zinc oxide	200	,,
Perfume	q. s.	

COMPOUND PERFUMES

The following are excellent perfumes for toilet powders, and where a dominant rate of sandalwood is desired the amount of sandalwood oil should be increased to taste:—

I

Bergamot oil	10	parts.
Otto of rose	1	part.
Benzyl acetate	1	,,
Ylang-ylang oil	0.4	,,
Ionone	0.3	,,
Orris oil (concrete)	0.2	,,
Musk amburette	0.3	,,
Vanillin	0.2	,,
Coumarin	0.5	,,
Methyl hydroquinone	0.2	,,
Synthetic flower oil	3.0	,,
Labdanum resin	0.1	,,
Moresse de china	0.1	,,
Styrax resin	0.1	,,
Sandal oil	1.5	,,

The synthetic flower oil may be varied according to taste such as syringa, wall-flower, lilac, etc.

For powder in which a rose type of odour is desired, the following is a useful formula, which may be cheapened, if required, by using artificial instead of natural otto of rose:—

II

Citronellol	50	parts.
Geraniol	100	„
Phenyl-ethyl alcohol	20	„
Geranyl acetate	10	„
Geranium oil Bourbon	25	parts.
Otto of rose	25	„
Phenyl-acetate acid	1	part.
Guaiac wood oil	15	parts.
Orange oil	10	„
Bergamot oil	10	„
Sandal oil	10	„
Vanillin	1	part.
Ketone musk	0.25	„
dissolved in		
Benzyl benzoate	2	parts.

For what one may describe as a highly floral odour for face powders, the following is an excellent composition:—

III.

Benzyl acetate	20	parts.
Artificial nerolin	2	„
Ylang-ylang oil	5	„
Autepin	2	„
Phenyl-acetic aldehyde	0.5	part.
Vanillin	0.5	„
Ionone	0.5	„
Sandal oil	2.0	parts.
Orris oil	0.5	„
Artificial otto of rose	2.0	„
Isocugenol	2.0	„
Artificial Civet	0.005	„

In all these cases about 0.6 to 0.8 part of the mixed perfume per 100 parts of the powder should be used, or if a strong perfume is desired upto 1.5 parts per 100.

TALCUM POWDERS

For powders of the type known as talcum powders, starch is not usually employed, although sometimes a little is present. A good type of this powder may be prepared as follows:—

Talc	1000	parts.
Boric acid	50	„
Maize starch	50	„
Zinc stearate	25	„

The starch may be omitted, and a little light carbonate of magnesia may be added.

The perfumes to be used are, of course, identical with those of other powders, and may be varied to a very great extent by using any of the following perfumes.

Some special types of talcum powders are as follows:—

I.

Talc	71	parts.
Precipitated chalk	20	„
Zinc stearate	3	„
Boric acid	5	„
Perfume	1	part.

II.

Talc	79	parts.
Magnesium carbonate	15	„
Boric acid	3	„
Magnesium stearate	2	„
Perfume	1	part.

It will be seen that talcum powders differ from face powders in that they possess little or no covering powder and are not so adherent.

Talcum powders intended for use after the bath differs from the foregoing in that it has less slip and considerable more absorbent.

The following formulas show the composition of this class of toilet powders:

I.

Talc	50 parts.
Kaolin	30 "
Boric acid	2 "
Precipitated chalk	17 "
Perfume	1 part.

II.

Talc	68 parts.
Precipitated chalk	15 "
Collodial clay	5 "
Boric acid	3 "
Magnesium carbonate	5 "
Magnesium stearate	3 "
Perfume	1.5 "

BODY POWDER

I.

Talc	800 parts.
Magnesium carbonate	70 "
Magnesium stearate	20 "
Zinc oxide	10 "
Boric acid	100 "
Perfume	q.s.

II.

Rice starch	80 parts.
Talc	490 "
Colloidal kaolin	300 "
Magnesium stearate	100 "
Perfume	q.s.

BABY POWDERS

I.

Talc	63.5 parts.
Kaolin	20 "
Zinc stearate	5 "
Precipitated chalk	5 "
Boric acid	.25 parts.
Perfume	.25 "

II.

Talc	53.5 parts.
Kaolin	20 "
Zinc stearate	5 "
Precipitated chalk	11 "
Boric acid	10 "
Carbolic acid	.5 part.
Perfume	q.s.

Compound Perfumes for Talcum Powders, etc.

The following are some of the compound scents for talcum powders, body powders, etc.:—

I.

Rose absolute	2 parts.
Isobutyl phenyl acetate	½ part
Citronellol	1 "
Palmarosa oil	1 "
Benzoin R	2 parts.

II.

Ionone beta	2 parts.
Heliotropin	2 "
Orris oil	1 part.
Violet otto	5 parts.
Ethyl myristinate	1 part.

III.

Triple extract of rose	3 parts.
Triple extract of jasmine	3 "
Triple extract of orange flower	3 "
Tincture of musk	8 "

—MANUFACTURE OF LATEX THREAD

OF the many methods which exist for the formation of rubber articles from latex the production of threads of rubber by extruding ("spinning" or "spewing") latex into a coagulant and drawing off the thin coagulum thus formed, would be one of the simplest. In actual practice the reverse is the case, owing to the large number of variables which effect the character of the coagulum and the difficulty of controlling some of them. Consequently the process may not have a great appeal for setting up on the small scale although it appears that an unsatisfied demand for the product exists.

The development of round latex thread which has taken place during the last twenty years or so has undoubtedly filled a great need and represents a striking technical advance. The extensive patent literature on the subject testifies to the great amount of thought and ingenuity which has been brought to bear on the problem.

Taking the matter chronologically, it may be noted that the rubber industry pioneer, Thomas Hancock, proposed the manufacture of thread from latex in 1838 although he had an alternative method to extrusion in mind. Despite this, the industry continued producing only the well-known square-cut thread made from dry rubber until the decade 1920-30, when the matter was taken up again, along with other latex developments, and culminated in the commercial production and use of latex thread which commenced about the end of this period. This development was recently brought up to date by a very concise and informative review.

The following note on the manufacture of latex thread reproduced from *Rubber Developments* issued by The British Rubber Development Board will be found helpful to our industrialists.

MAKING LATEX THREAD

Bearing in mind that when making thread from solid rubber a suitably prepared and vulcanised rubber sheet is slit longitudinally, thus yielding a thread of square cross-section, the following alternatives may be seen to exist in the case of latex although only one of them would seem to be really specific to the use of some form of liquid rubber, namely by deposition in a groove on a roller, on the edge of a disc or on some other suitable surface. The alternative latex methods are:—

1. Extrusion through an orifice ("spinning," "spewing," "forcing").

2. Deposition on a surface and subsequent removal when set.

3. Slitting latex rubber sheets (as proposed to sheets made from dry rubber).

Many possible variants of these processes exist but in practice the method adopted for making latex thread is a particular form of extrusion. Some of these variants, details of which may be found in the patent literature, may be briefly noted, thus:

Extrusion may be: of a suitable latex mix into a liquid coagulant or into a drying atmosphere or into hot or cold conditions which react to coagulate appropriately compounded latex mixtures or alternatively the coagulant may be flowed into latex. In all of these cases the direction of extrusion may be horizontal, vertical or inclined at any angle. In practice use is made of the vertically upwards direction. Extrusion may also be through a single nozzle, a cluster of nozzles, annular rings, stationary or vibrating nozzles and so on.

Deposition on a surface may be made on the edge of a disc, in the groove of a drum or roller, on a belt, band or wire, etc. The treated surface may be contacted with coagulant, heated, or the deposit simply dried, in order to set it, after which it is stripped from the form. Threads produced by these methods are likely to have an irregular section, but may be twisted, rolled, etc., to consolidate them and to form a circular type of cross-section.

Cut latex thread, made by slitting performed latex sheets, represents an intermediate type of product. It has a square cross-section and rather rough edges like the old material but is composed of latex rubber and thus has superior wear and age-resisting properties, etc., compared with the dry rubber product.

So far as is known, no commercial production has resulted from the methods listed under headings 2 and 3, although for sheer rate of output it is difficult to imagine anything faster than disc running in latex, from the edge of which a thread is continuously stripped. However, for practical operation this process needs the interposition of a very rapid coagulating step, confined to a part of the disc, and this presents difficulties. Also, as already mentioned, the cross-section of such threads tends to greater irregularity than is desirable.

Turning to the extrusion method as currently used for the production of round latex thread the method consists of flowing precompounded latex down glass tubes to orifices located at or near the bottom of the bath of coagulant (aqueous acetic acid). The resulting threads of coagulum are drawn upwards by rollers and pass on to the drying and vulcanising, chalking, reeling, etc., mechanisms. The flow of latex is controlled by the height at which the reservoir containing it is fixed. In order to produce more than one gauge of thread from any given size of orifice the draw-off rollers may be run at different speeds. R. G. James has given a formula for relating the diameter of round latex thread (the "count") to eight factors which govern the extrusion-process, and points out that the two factors chosen for controlling the process are the head of latex (i.e. extrusion pressure) and the rate of running the draw-off rollers. These factors are the most easily adjusted. The "count" of a thread is the side by side, to fill a space of 1 in. Thus number of threads required, when placed 20s count (a coarse gauge) have a diameter of 1/20th in., and so on. The latex extrusion process has lent itself particularly well to the production of much finer counts of rubber threads than it was possible to make by the old cutting process; and also to making much longer lengths of continuous thread. These changes have led to appropriate developments in the textile field.

The characteristics of some commercially produced latex threads are as follows:—

Count	Diameter (inches)	Modulus at 300% Extension (lbs. per sq. in.)	Yards per Pound	Tensile Strength (lbs. per sq. in.)	Elongation at Break (%)
20's	0.050"	290	400	3,700	940
30's	0.033"	300	900	4,840	920
40's	0.025"	300	1,600	4,980	920
50's	0.020"	300	2,500	5,700	900
75's	0.013"	320	5,350	5,980	820
100's	0.011"	325	9,500	6,410	800
125's	0.008"	315	14,850	7,120	800

APPLICATIONS OF LATEX THREAD

Turning now to the uses of latex thread, it is necessary to bear in mind that rubber is the most highly extensible material known. Properly compounded and vulcanised latex rubber will stretch readily, even to 1,000 per cent. of its original length, before breaking. No other polymer will do this, but unfortunately it is not a particularly valuable property. What is usually required is a lower degree of extensibility, or what is known as a steeper stress-strain curve (or higher modulus); in other words, a tougher rubber.

In the case of the original square-cut thread, this toughness was obtained by "curing up to the hilt"; that is to say, by compounding the rubber with a high proportion of sulphur, giving the mixture a thorough vulcanisation by heating it in steam and finally removing the excess of sulphur which bloomed on the surface by boiling in dilute alkali solution. Such thread had a sufficiently high modulus and formed the basis of the elastic garments of the past. Its life, however, was limited and it was readily damaged by heat and sweat.

In the case of latex thread, its high, and ready, extensibility was more pro-uounced even than with square-cut thread, but it had the advantage of better ageing properties. The problem, therefore, was to increase the toughness or modulus of the latex rubber. It would seem that this might have been done to a certain extent by appropriate compounding, but this presents some difficulties in the case of latex. In the result a method was adopted of stretching the latex thread and then covering it while stretched with one or more laterally applied textile threads. By varying the extension of the rubber thread and the speed and number of lateral textile wrappings, it has been found possible to produce a range of textile-covered rubber threads with limited ultimate extensions, ranging from 75 to 300 per cent.

There is another reason for limiting the extensibility of rubber threads. When they are woven into fabric in a loom their ready extensibility causes trouble. Looms are designed to handle substantially inextensible textile threads and will not operate satisfactorily with elastic threads as these do not placidly take up their allotted position in the fabric. To some extent similar considerations apply to knitting. To overcome this problem, T. L. Shepherd and co-workers introduced the concept of the extensibility reducing agent. This was a material which was added to the rubber thread to make it less "rubbery" before weaving and removed afterwards. In the simplest form of the process the latex was compounded with glue or similar water-soluble colloid and after weaving the relatively inextensible glue and rubber threads, the fabric was boiled in water to remove the glue and restore the extensibility; if necessary with the aid of glue solubilizing agents such as urea. Innumerable variations of this principle were investigated, details of which will be found in the patent literature. Approximately similar results are obtained by the cotton covering process by which extensibility may be sufficiently limited to enable weaving to be carried out, and in practice this is the method used. More recently also the method of handling bare threads under extension in the loom has been mastered. Finally it should be noted that the cotton covering process has an additional advantage, it provides a protective cover for the rubber, which is very necessary for the finer threads, which might otherwise deteriorate more rapidly through exposure to light and air, etc.

Latex threads are used in the bare state for elastic goods such as braces,

 3

knicker elastic, etc. (counts 30s. to 50s.), and in multi-thread cords for industrial applications (count 20s.). In the cotton-covered form latex threads find many applications, such as corsetry, bathing dresses, special effects such as ruching, hosiery, undergarments and so on (counts 36s. to 125s.).

As to the future, it would seem that "elasticity" having been tamed, the future for extensible threads should be plain sailing, but why not pass to partners new? A signpost points the way that leads to another possibility for rubber as a raw material in making "fibrils, threads, films and filaments. The possibilities of inextensible, or fibrous, rubber threads, e.g. as tyre cords, etc., challenge the rubber physicists.

—MOULDED INSULATORS

MOULDED composition insulators have long played an extremely important part in instrument and apparatus work, but their adoption in power machinery has been very slow when considered in relation to their potential possibilities, both as a solution of insulating difficulties and as a means of utilizing as fillers materials which are otherwise factory waste.

Moulded articles fall into, two general classes:—

(a) HOT MOULDINGS produced with bonds which only become plastic under the influence of heat. This class includes:

1. Bitumen mouldings.
2. Rubber Mouldings (ebonite).
3. Mouldings produced with natural resins and gums (including shellac).
4. Synthetic resin mouldings.
5. Celluloid and artificial celluloid mouldings.

(b) COLD MOULDINGS produced with bonds plastic at atmosphere temperature, but which solidify on exposure to the air or when brought into contact with mediums. This class includes:—

1. Portland Cement Mouldings.
2. Mouldings made with clays as binders.

4. Mouldings made with casein and other organic adhesives as binders.

BITUMEN MOULDED ARTICLES

Before the greater number of the moulded materials used in electrical power engineering, such as for instance, switch handles, cable rack blocks, switch bases, terminal boards, etc., are made with bituminous binders, generally with the addition of small quantities of natural resins to give hardness and good finish. The fillers used in this class of moulding include wood sawdust, pulverized paper, chalk, asbestos fibres, powdered marble, cotton waste, etc. The amount and nature of the filler employed depends on the service the article has to endure: switch handles, for instance, are frequently produced with an organic filler, but for switch bases, terminal blocks, etc. asbestos fibres are largely incorporated in order to give at least a semblance of being fireproof. Bitumen moulded articles have a low water absorption and may be used upto 99°C. Their electric strength depends very largely on the filler employed, and is found to vary from 50 to 300 volts per mil.

The process of manufacture is comparatively simple the chief difficulty being in the production of suitable moulds. The bituminous material employed is mixed hot in a special pan, in which it is agitated by powerful impelling screws; it is then bricketted into brickettes or rolled into slabs containing just sufficient material to reproduce the articles to be moulded. The brickettes are put into heated moulds after being raised to a temperature in the neighbourhood of 100°C. on a hot plate, and are pressed to shape in power presses. Bitumen mouldings of this kind can be removed from the moulds immediately and require no further curing. Contractor arc boxes and other parts containing a large percentage of asbestos fibre, but made with bitumen are classed by the E.R.A., as class D self-extinguishing mouldings.

RUBBER MOULDINGS (INCLUDING EBONITE)

Rubber mouldings, including ebonite and vulcanite materials are very extensively employed in high-grade instrument and apparatus work: as for instance in telegraph and telephones apparatus, radio equipment measuring instruments, etc.

Rubber mouldings are non-hygroscopic and have a high dielectric strength, reaching 400 volts per mil in favourable cases. Special ebonite materials are produced which have electric strength as high as 600 volts per unit, but these are too expensive to be regarded as commercial materials. Rubber mouldings should not be used when temperatures are likely to exceed 80°C.

Generally rubber products are compounded of sulphur and pure rubber without any other ingredients, but the great majority of rubber mixings contain organic fillers (paraffin wax, pitch, rosin, tar and rubber substitutes made from linseed oil) and inorganic fillers (whiting, barium sulphate, lithophone, french chalk, zinc oxide, etc.).

In addition to these fillers certain ingredients known as accelerators are generally included in order to increase the speed of vulcanization. Litharge, slaked lime, magnesium oxide, and magnesium carbonate are the materials most generally used for this purpose.

In actual ingredients and quantities of the mixings employed are in general regarded as close secrets by the manufacturers. After being weighed out in proper proportions the material is thoroughly mixed by special mixing machines and afterwards passed repeatedly through series of too thin and plain rollers, after which it is ready for rolling into sheet extruding from dies as rods or tubes, or converting into moulded articles.

The actual process of moulding ebonite parts is very similar to that employed in producing bitumen mouldings, except that the parts cannot be removed from the moulds until they are partially vulcanised. After partial vulcanisation it is, however possible to remove the mouldings, and vulcanization is then completed by exposing the parts to steam pressure at a temperature of 130° to 140°C for 3 to [illegible] hours, varying according to the percentage of pure rubber incorporated in the mixture. In this process the temperature is raised slowly, taking one-half to three-quarters of an hour to reach its maximum.

Where it is required that the parts shall retain a certain amount of resilience, this property is retained by cutting short the vulcanization process.

NATURAL RESINS & GUMS USED AS BINDERS FOR MOULDINGS

A number of mouldings are made employing natural resin and shellac as a binder. Such mouldings, although extensively used for a large number of purposes, including switch handles, telephone parts, automatic telephone relay blocks, etc. cannot be safely used at temperatures above 60° to 70°C. The materials sold as "Insulate" is an excellent example of a shellac base moulding. This particular material is claimed to have an electric strength of 300 volts per mil when made with a suitable filler. The process of manufacture is exactly similar to that employed in the production of bitumen mouldings utilizing the same fillers.

SYNTHETIC RESIN MOULDINGS

Synthetic resin mouldings, using resins of the so-called "bakelite" class, have played an extremely important part of recent years. Many complicated and high-class mouldings have been made for purposes such as magnetic distributors, battery containers, multi-point jumper insulation, etc. and have given the greatest satisfaction. These mouldings can be utilized at temperatures up to 105°C (with organic fillers) and 150°C (with inorganic fillers), and possess moderately good electric strength, varying from 80 to 200 volts per mil.

In general, they are very slightly hygroscopic and resist the action of acids

and weak alkalis. The only serious drawback against their use is their inability to withstand the action of an electrical discharge without the tracking inherent in all phenol-aldehyde products thus far commercially developed. This defect naturally prevents bakelite mouldings being effectively used where exposed to an electric arc. The process of manufacture of synthetic resin mouldings is different from that employed for the other materials described above. The synthetic resin, in its intermediate stage of condensation is mixed with wood flour, pulverised asbestos, or other appropriate filler, and is supplied in this form by manufacturers ready for moulding. The actual process of moulding consists of introducing a weighed quantity of the powdered mixture into heated moulds and pressing at a temperature of approximately 150°C. The resin fluxes at this temperature, and, uniting with the filler, forms a material which only remains plastic for a very few moments, since under the influence of temperature the resin quickly passes into its final condensation state and becomes hard and insoluble.

In the larger sizes of mouldings, the pressure must be retained from 10 to 15 minutes, and special provision has to be made for keeping the moulds hot during this time. It may be noted here that in a production of certain smaller types of synthetic resin mouldings, the raw material is made from fillers mixed into the synthetic gum in its liquid state and is therefore in a plastic condition when introduced into the moulds.

MOULDINGS MADE WITH CASEIN AND OTHER ORGANIC ADHESIVES AS BINDERS

Casein is the base used in a large number of moulded products very satisfactory for electrical work. Probably the best known of such products is Galalith. This material is produced by the action of formaldehyde on carefully matured plates, prepared from casein by precipitating a solution of casein in dilute caustic soda or ammonia with acid. The process of manufacture of Galalith consists in soaking the plates obtained as above in formaldehyde and afterwards drying, when they form a white-translucent product similar to ivory. Mouldings are made from the material by warming in hot water, when they become plastic and can be pressed in moulds to any desired shape.

PORTLAND CEMENT MOULDINGS

Portland cement mouldings as insulators come within the class of cold mouldings, and into this class fall the asbestos cement products, including moulded arc shields and arc boxes. The most outstanding use of portland cement as an insulator at the present time is in the manufacture of concrete type reactance coils. In the manufacture of crucibles and switchgear partitions the material only plays the part of secondary insulation, and can hardly be regarded as an insulator proper.

Portland cement mouldings are not produced under pressure, but are cast in metalfaced wooden moulds.

Asbestos cement moulded parts, using asbestos fillers with portland cement or lime as binders, are almost invariably produced under pressure.

All these materials are extremely hygroscopic, and consequently their electrical strength is found to vary from 5 to 100 volts per mil.

MOULDING MADE WITH NATURAL CLAYS

Soapstone clay, bentonite, and similar strong natural clays are frequently used as binders in the manufacture of highgrade non-inflammable moulded parts. The use of these binders renders the products less brittle and less hygroscopic than those made with portland cement. Such mould-

ings also show less deterioration under the action of an electric arc, and consequently are largely used for traction and industrial control work.

MOULDINGS MADE WITH SODIUM SILICATE

Sodium silicate has disadvantages as a bond, due to the tendency to produce hairy crystalline growth on the surface of mouldings in which it is used if exposed to dampness. Nevertheless, it is frequently used in conjunction with asbestos fibre to produce arc shield materials.

It may also be pointed out that some of the better grades of asbestos cement boards are treated with sodium silicate and carbonate of soda during the process of manufacture, in order to render them non-hygroscopic.

—TUBRI or GERBE

IN modern times pyrotechny plays a very important part in civil and religious ceremonies and especially at the time of Dippali when fireworks worth of several lac of rupees are burnt in course of a single day. Of the indigeneous fireworks the most popular are the gerbes which being less dangerous are taken up by both amateur and professional firework makers.

This consists of a casing of burnt clay of different sizes and shapes charged with powder mixture of special type. The case has two openings one wide about 1 inch and the other narrow like a pencil. The former assists in filling the case while the other for ignition and burning. The characteristic feature of these types of fireworks is that when ignited a brilliant shower of sparks like that of a fountain emerges up with a great force reaching a considerable height emitting dazzling light.

There are different varieties.

INGREDIENTS REQUIRED

The principal ingredients required in making a variety of gerbs are as follows:—

1. Refined saltpetre.
2. Roll sulphur.
3. Wood charcoal.
4. Steel filings.
5. Potassium chloride.
6. Aluminium powder.
7. Shellac.
8. Refined sugar.
9. Magnesium powder.
10. Barium and strontium nitrate.
11. Burnt clay moulds of various shapes and sizes.
12. Clay, etc.

REFINING SALTPETRE

The saltpetre generally contains several impurities, the most troublesome of which are the chlorides. Since saltpetre is mainly utilized in the manufacture of gun-powder and fire works, it is absolutely necessary to remove the objectionable chlorides, because they really absorb moisture and thus spoil the whole. The usual method adopted by the manufacturer is stated thus:—

In an iron pan 1050 lbs. saltpetre is dissolved in 600 lbs. of water at a gentle heat; the solution is brought to boiling heat, and another 188 lbs. of saltpetre is dissolved in it. When employing these proportions with saltpetre containing about 20 p.c. of chlorides, the nitrate is dissolved completely, but the chlorides partially. The latter is fished out with a perforated ladle. If calcium or magnesium salts are present, potassium carbonate is added until a fairly alkaline reaction has been produced. The hot clear liquor is diluted with 300 lbs. of water, a solution of 1 lb. of glue dissolved in 44 lbs. of hot water is stirred into it, and the whole brought to boiling again. The glue combines with organic substances present forming scum which rises to the surface and is carefully removed. When scum rises to the surface, the liquor is allowed to settle for 24 hours in a warm place and the clear portion is run into flat copper coolers. As soon as the crystallisation begins, the liquid is constantly stirred, either by hand or better by machinery. Thus the potassium nitrate separates as minute, flowery crystals. These are drained off and cold water is sprinkled over them to remove all adhering mother liquor. This is usually done in vessels provided with a perforated false bottom, covered with linen. Finally the flowery particles are dissolved in a small quantity of hot water and then set aside to cool without disturbing, when large crystals of saltpetre

begin to appear. It is a valuable fertiliser.

PREPARATION OF WOOD CHARCOAL

As charcoal is the only product in view, the carbonization of wood may be done in pits or kilns and the volatile products go to waste. For this purpose the wood is heaped in a hemispherical pile around a central opening, and covered with earth and sod, leaving only a few small draught holes near the bottom. Then it is ignited at the centre and allowed to burn until the whole pile is on fire. A smouldering combustion takes place, largely at the expense of the oxygen and hydrogen of the wood fibre, forming water, carbon dioxide, and volatile hydrocarbons, which escape, the draught holes are then all closed and the heat is kept carefully covered until the fire smothers and the charcoal is cold.

STEEL FILINGS

A beautiful scintillating effect is produced with steel filings. For gerbs making steel filings known as needle steel are employed. This resembles broken sewing needles but is really a by-product of some turning or planning operation. The steel filings from raw filing shops are quite good provided they are the result of hand filing and not the particles thrown off by emery wheels, which are useless for pyrotechnical purposes. When steel filings are added to gerb compositions, the saltpetre quickly attacks them, frequently causing the gerb to become quite hot. The steel is rusted and this action practically destroys its usefulness. To prevent this the steel must be coated in some way that the saltpetre cannot attack it which may be accomplished as follows:—

In an agateware saucepan place a piece of paraffin and carefully melt it, heating as much as possible without permitting it to smoke. To this add clean steel filings, as much as the paraffin will thoroughly coat. There should be no surplus of paraffin but just enough to completely cover each filing. Shake the pan and stir frequently while cooling to prevent the filings from caking. Steel filings are also used for stars in rockets and shells.

CLAY

This is used for closing the bottom end of the case after it is fully charged. Any kind of clay will do. It must be thoroughly dried, pulverised and sifted. Before using it may be slightly damped. For convenience where a large quantity is required, powdered fire-clay may be used as this saves the rather tedious job of drying and powdering.

METAL POWDER

This article is used considerably in display work for gerbs as a blowing charge. To prepare this mix the following ingredients thoroughly in the proportion given:—

Saltpetre, double refined	15	parts.
Charcoal	3	,,
Sulphur flour	2	,,

Some typical formulas follow:—

ORDINARY

Nitre	10	parts.
Sulphur	2½	,,
Charcoal	2	,,
Cast iron filings	6	,,

Expose the ingredients in the sun to dry, then grind the first three substances separately in a mortar and pass through fine cloth. Weigh and mix. Now take the iron filings free from rust and of the size of poppy seed—but the size may vary according to the shape and size of the mould used. Mix the whole and load the clay mould carefully through the bigger opening and press tightly, which is then plugged with hard mud. The smaller

opening is then pasted on with paper which is ignited on firing.

CHANDRA MALLIKA

Nitre	10	parts.
Cast iron filings	4	,,
Sulphur	2	,,
Charcoal	1¼	,,

Proceed as above.

HAZARI

Nitre	16	parts.
Cast iron filings	8	,,
Sulphur	3	,,
Charcoal	3	,,

Proceed as above.

JASMINE

Nitre	80	parts.
Sulphur	5	,,
Charcoal	6	,,
Cast iron filings	10	,,

ROSE BUD

Meal powder	6	parts.
Saltpetre	2	,,
Sulphur	1	part.
Charcoal	1	,,
Steel filings	1	,,

FLOWER POTS

Saltpetre	10	parts.
Sulphur	6	,,
Lampblack	3	,,
Steel filings	6	,,

ELECTRIC TUBRI

In preparing this sort of gerbe the ingredients are generally of a quite different category. Instead of nitre, charcoal and sulphur which are used in making ordinary gerbes, use is made in this case simply of shellac of fine grade and chlorate of potash. For attaining success in manufacture it is desirable that the shellac should be reduced to powder and finally passed through a piece of coarse cloth. The potash is also sifted through a fine cloth. Precautions should however be taken that the ingredients do not come in contact with other substances particularly sulphur, otherwise due to explosion dangerous consequences may follow;—

A couple of typical recipes follows:—

I.

Chlorate of potash	16	parts.
Shellac	6	,,
Magnesium powder	8	,,

II.

Chlorate of potash	16	parts.
Shellac	4	,,
Aluminium	10	,,

FLYING TUBRI

This should be prepared as fresh as possible. Otherwise, sugar being in contact with chlorate of potash for a good length of time is liable to get oxidised with the result that the Tubri is likely to burst and may not ascend to a great height. Grind each ingredients separately and sift through a fine cloth and then weigh out and mix.

ORDINARY

Chlorate of potash	10	parts.
Refined sugar	4	,,

RED

Chlorate of potash	10	parts.
Refined sugar	4	,,
Strontium nitrate	1	part.

BLUE

Chlorate of potash	10	parts.
Refined sugar	4	,,
Copper sulphate	1	part.

GREEN

Chlorate of potash	10	parts.
Refined sugar	4	,,
Barium nitrate	1	part.

YELLOW

Chlorate of potash	10	parts.
Refined sugar	4	,,
Soda	1	part.

The ingredients are powdered separately, sifted, mixed thoroughly and then charged into tiny clay moulds.

—Cultivation of Sweet Potato in South India.

IN the tropics, four root crops share honours for the place occupied by potato in the diet of the people of temperate climes. These are, Sweet potato, Tapioca, Yams and Colocasias. Of thesee the Sweet potato (Ipomaea batatas L. Lam) is a trailing herb of the morning glory group convolvulaceae.

The home of this root crop is believed to be Mexico. Obviously it found its way to the Orient very early, being heard of in China as early as the second century A.D. The term batata is of Malayan origin. The crop is found throughout the tropics and also in warm temperate regions. Though found all over India, worthwhile acreage is to be met with only in Bombay, Central Provinces, United Provinces, Punjab and Hyderabad. In Mysore, the crop is considered to be a vegetable and is raised only to a very limited extent as described in *The Mysore Agricultural Journal.*

SOILS

Though drought-resistant, Sweet potato is usually grown under irrigation on garden lands. The area under it in any holding in a season is usually small, rarely exceeding quarter of an acre. In parts of Hassan and Belur it is often found on dry lands as a rain-fed crop. Sometimes a summer crop is raised on river beds like melons. Such patches of Sweet potato are found on the beds of Tunga, Hemavathi and Kapila. While not fastidious as to the nature of the soil, the crop does best on deep friable loams. Adequate drainage is essential since Sweet potato does not withstand water-logging. On light sandy soils the vines make poor growth and returns are low. Such soils require large quantities of manure and frequent irrigations to become productive. While harvest is speedy and easy, a large amount of unshapely long stringy roots are obtained. Heavy soils yield a larger crop with a smaller amount of manure and less frequent irrigations. While root shape and size are of desirable quality, the harvest will require a greater amount of time and labour. On very stiff soils, the roots will be of small size. On rich soils, the crop usually makes rank top growth at the expense of parts below ground. It is usually a first crop of newly formed gardens or of gardens allowed to lie fallow. Weed infested plots are purposely planted with sweet potatoes, since the vines choke out the weeds and the harvest clears the land.

The crop requires a long warm growing season. Heavy rains are to be avoided, since excess of moisture is always harmful to the crop. When the vines are young and not properly rooted, heavy rains induce decay of vines and result in poor stands. In the presence of excess moisture, the growing crop runs to rank top growth. On wet soils, the maturing crop is liable to serve root infections.

TYPES

Two types of Sweet potato—the red and the white—are under cultivation. Commercial stocks are considerably mixed up but work on isolation of superior clones is under way. The red type conconsists of races with roots of varying shades of scarlet and pink with sweet taste. The flesh is not fibrous and these types are preferred for culinary purposes. While the cropping capacity is poor the keeping quality is considered to be superior. The white type produces creamy, brown roots. The flesh is not so sweet; hence, less palatable. The roots are slightly larger in size and more

crisp in texture. While less vigorous than the red types, the cropping capacity is greater but the roots are supposed to undergo much loss when held in storage.

PLANTING SEASON

Usually planting is done in May or June, the crop coming to harvest in November. In regions of heavy rainfall the vines are planted during the months of October and November, the roots being lifted in March or April next. Round about Bangalore, considerable off-season plantings take place to meet the demands of the vegetable market.

PREPARATION OF THE LAND

Thorough preparation of the land is necessary to obtain satisfactory yields. The plots are brought to a fine tilth by the repeated use of plough and harrow. As a rule, manure is applied to light sandy loams. On better grade soils, manure is usually not used or if at all, in sparing quantities. The general belief is that a direct application of manure to the crop results in rank top growth with consequent diminution of yields. The common practice is to liberally manure the preceding crop and allow the succeeding sweet potato to fend for itself. The plot is then laid out into beds 12 ft. by 6 ft. or 10 ft. by 10 ft. which dimensions are considered to be convenient for purposes of irrigation. Slips or vines are planted on to these beds, a common spacing being a foot and a half between rows and one foot in the row. Frequently the vines are set in shallow depressions made in such level beds. Sometimes the beds are thrown up into ridges a foot and a half apart and vines set halfway down the slopes. While ridge culture involves a little extra labour and more copious irrigations, the trouble and expense is offset by the ease of harvest. The method of planting has no appreciable influence either on the quality of the produce or on its quantity.

PROPAGATION

Propagation is by slips or vines. A slip is a small shoot with a few roots at the lower end. These are obtained from bedded roots, each root throwing out several slips. Two crops of slips may be gathered from each bed. About 10 maunds of roots is bedded to provide slips sufficient to plant an acre. The shape and size of the bedded roots has not much influence on yield. Large roots require a heavier rate of bedding, while small ones throw out weak slips, hence both is to be avoided. Slips are ready in about five weeks after bedding and should be about six inches in length.

PLANTING

Planting of vines is more economical and is the usual method in vogue. Now and then vines from a standing crop are used directly for planting. This is an undesirable procedure since the chances of carrying over the weevil are ever present. Vines are usually obtained from special nurseries, started with cuttings from the crop of a previous season. Sometimes overaged slips furnish material for planting. The tender tips and the hard lower end of shoots are not used for planting. Cuttings should be made from that part of the vine which, when pressed gently between the fingers, is not crushed but remains pliable. The vines are set slantwise with a couple to modes below ground level and bearing the same number on the top free end. Sometimes the vines are planted in a loop with a portion above the surface.

IRRIGATION

The slips or vines are set into moist beds on a cloudy day. Till the vines root freely, water if at all applied is given sparingly. Subsequent irrigations are given freely as the necessity is felt. The frequency of irrigations and the amount of

water applied is governed by the nature of the soil, amount of rainfall, humidity, and the age of the crop. The young crop is weeded once and the trailing vines turned over periodically without causing appreciable injury. If left undisturbed the vines root freely at the nodes producing a large quantity of small-sized unmarketable roots. As the roots begin to thicken the tips of vines are usually pinched off. This is believed to increase the size and yield of roots and hasten maturity. These tender tips may be used as greens.

TIME OF MATURITY

The crop lacks any pronounced visible signs which indicate maturity. Bronzing of leaves is often an indication and another is the so-called latex test. The sweet potato is said to be ripe when it exudes very little latex when cut across and this hardens off very rapidly. Premature harvest often takes place to meet the demands of the early market and for consumption on the homestead. An immature crop results in lower yield, greater amount of bruising while harvesting and subsequent handling, lowering of flavour and cooking quality, poor keeping quality, hence greater loss before the produce is disposed off. Irrigations cease when the crop is judged to be ripe. A mature crop can be left standing without any risk of deterioration, if the state of weather is favourable. This, not only results in an increased yield, but also spreads out the period of harvesting giving the grower an opportunity to search for favourable markets and reduces his storage problems.

HARVESTING

The vines are usually cut before the roots are dug up. The green tops find a ready use as fodder. After harvest, the roots are cleaned, graded and disposed of in the nearest market. Yields are very variable, a good crop resulting in over 400 maunds of marketable roots. Half of the above would be a fair average yield.

COST OF PRODUCTION

Calculated cost of production for an area would be:—

	Pair	Men	Women	Boys	Rs.	As.
Preparatory cultivation and laying out beds	—	32	4	—	19	14
Manure and manuring	1	2	2	—	8	2
Nursery of vines	—	—	—	—	7	0
Planting	—	—	16	—	4	0
Weeding, turning over & pruning of vines	—	—	23	—	5	12
Irrigations (12)	—	—	—	—	12	0
Harvesting	1	6	20	6	10	9
Land rent and watch	—	—	—	—	10	0
Marketing charges	—	—	—	—	5	0
					82	5 or 82

Realization (200 mds. at As. 10 per md.) ... ... Rs. 125
Approximate profit per acre ... ... „ 42

Since the crop is drought-resistant and very hardy, it is troubled by a few pests and diseases. The one pest which often causes loss is the weevil. Excess of moisture favours the development of several rot organisms in the standing crop as well as in the stored produce. Field rats and white ants usually cause considerable damage.

A considerable portion of the produce is consumed near the centres of production, the remainder finding its way to the urban markets. While no export trade exists, a small quantity is usually import-

from neighbouring provinces for supplying the markets of large towns. Trade is inconsiderable and mostly local.

POSSIBILITIES FOR EXPANSION

Considerable possibilities exist for the expansion of Sweet potato production in the State. A foremost necessity is to raise the average yield which can be easily trebled or even quadruped. This is to be effected by replacing the present commercial stocks by suitable heavy croppers, which could be obtained by breeding and by introductions from outside. Devising of suitable manures and fertilizer mixtures to raise the present low yield is also of very great importance. As regards expansion of acreage, much headway can be made in the Kar tracts of Mysore and Hassan for the dry crop. The Irwin Canal area offers unbounded possibilities for the irrigated crop.

The resulting increase in out-turn naturally calls for the devising of suitable methods of curing and storage. Marketing facilities have to be created and additional markets looked for. The lowering of production costs also ought to be aimed at to enable the sweet potato to comprise favourably with other food products and raw materials needed by industry. It may also prove expedient to set up new industries like dehydrating concerns, starch factories as the starch in this is considered to be better than Tapioca and alcohol plants.

—PHARMACEUTICAL RECIPES

VOICE & THROAT TABLETS

Citric Acid powder	2	oz.
Milk sugar, powder	2	lbs.
Sugar, powder	3	„
Gum acacia, powder	4	oz.
Carbolic Acid	½	„
Menthol	½	„
Tincture of iodine	4	fl. oz.
Solution of formaldehyde	8	„
Simple syrup		q.s.

Mix all the ingredients excepting carbolic acid, menthol and tincture of iodine, to a damp powder and pass through a 20 mesh sieve and dry. When ready for compressing, add the remaining three. Dry again in a warm place. Make 15 gr. tablets.

COMPOUND TINCTURE OF CHIRATA (I.P.L.)

Chirata, cut small and bruised	100	grms.
Dried sweet-orange peel, bruised	37.5	„
Cardamom, bruised	12.5	„
Alcohol (45 p. c.)	1000	c. c.

Macerate the chirata and other ingredients with 500 c. c. of the alcohol for seven days. Then strain and dilute with remaining portion of alcohol.

LIQUID EXTRACT OF KALMEGH (I.P.L.)

Liquid extract of Kalmegh contains not less than 0.5 per cent. of andrographolide.

Kalmegh	500	grams.
Oil of fennel	2	c. c.
Oil of ajowan	2	c. c.
Alcohol (90 p. c.)	a sufficient quantity.	

Boil the kalmegh with 1500 c.c. of water for half an hour and strain. Add further 1500 c.c. of water, boil for half an hour, strain. Repeat the process until a total of 2000 c.c. of the extract are collected. Mix and concentrate to 250 c.c. on the water bath. Dissolve the oil of ajowan and oil of fennel in 200 c.c. of alcohol (90 p.c.) and add this alcohol solution to the concentrated extract. Determine the content of Andrographolide and add enough alcohol to produce a compound liquid extract of kalmegh of required strength.

LIQUID EXTRACT OF BAEL (I.P.L.)

Bael, bruised	1000	c. c.
Chloroform water	15000	„
Alcohol (90 p. c.) sufficient to produce	1000	„

Macerate the bruised bael for 12 hours in 5600 c.c. of chloroform water; pour off and remove the clear liquid; repeat the macerate a second and a third time for one hour in each case, using for each maceration 5000 c.c. of the chloroform water and strain the mixed liquids. Evaporate to 750 c.c.; cool; add sufficient alcohol (90 p.c.) to produce the required volume. Set aside for 48 hours and filter.

CANTHARIDIN LOTION

Cantharidin	1½	gr.
Acetone	1	fl. oz.
Castor oil	4	„ „
Alcohol (90 p. c.) to produce	20	„ „

Dissolve the cantharidin in the acetone, add the castor oil and sufficient alcohol to produce the required volume.

SYRUP OF ROSE (B.P.)

Red-rose petal, dried	1	oz.
Dilute sulphuric acid	130	mins.
Sucrose	a sufficient quantity.	
Distilled water, boiling	10	fl. oz.

Infuse the red-rose petal in the distilled water for 2 hours; strain, press, heat the infusion to boiling, filter, add to the filtrate twice the weight of sucrose, and dissolve with the aid of heat; cool, replace the water lost by evaporation, add the dilute sulphuric acid, and mix.

SYRUP OF LEMON JUICE (B.P.)

Lemon peel, in thin slices or grated	175	gr.
Lemon juice, fresh	10	fl. oz.
Sucrose	15	oz. 87½ gr.
Alcohol (90 p. c.)	a sufficient quantity	

Macerate the lemon peel in 288 minims of the alcohol for 7 days, press, filter, and add sufficient of the alcohol to produce 384 minims; clarify the lemon juice by subsidence of filtration add the sucrose, and dissolve with the aid of gentle heat; cool, add the alcoholic liquid, and mix.

EFFERVESCENT MAGNESIUM SULPHATE.

Exsiccated magnesium sulphate	385	grms.
Sodium bicarbonate	360	„
Tartaric acid	1.90	„
Citric acid	125	„
Sucrose	105	„

Mix the ingredients thoroughly, place in a suitable vessel and heat to between 95° and 105°C. When the mass has, by careful manipulation, assumed a uniformly plastic condition, it is passed through a sieve of suitable mesh to produce granules of the required size. The granules are dried at a temperature not exceeding 55°C and should be stored in well-closed containers.

—Recipes for Small Manufacturers

BANANA SYRUP

This may be prepared from the fruit by mashing 1 lb. of bananas to a pulp, adding 1 pint of water and 5 pints of syrup, bringing to the boil, straining and adding citric acid 120 grains dissolved in water ¼ fl. oz.

This may also be prepared artificially as follows:—

Syrup	1	gallon.
Citric acid solution (1 in 2)	¼	oz.
Banana essence	1	„
The banana essence is made by mixing.		
Amyl Butyrate	¼	„
Amyl acetate	¼	„
Butyric ether	1	„
Turmeric	8	gr.
Rectified spirit	5	oz.

EXTRACT OF MALT WITH VITAMINS

Extract of malt with vitamins in each fluid drachm approximately 3000 units of vitamin A and approximately 225 units of vitamin D. It may be prepared with standardised cod-liver oil concentrate suitably adjusted, if necessary, or by the following process:—

Solution of Vitamin A.	70	gr.
Solution of Irradiate Ergosterol	105	„
Groundnut oil	210	„
Vanillin	7	„
Extract of malt to produce	16	oz.

Mix the solutions of vitamin A. and irradiated ergosterol and the vanillin with the groundnut oil and rapidly incorporated with the extract of malt in a warm mortar.

It should be stored in coloured bottles.

Dose 1¼ to 1 fl. oz.

ETCHING IVORY ARTICLES

Although decorations on ivory articles, such as umbrella handles, cuff-buttons, fans, book covers, boxes, etc., are generally engraved; the work is frequently done by etching. The patterns must be very delicate, and are executed in lines only. The simplest way is to cover the surface with a thin rosin varnish. Then transfer the pattern and scratch it out accurately with a pointed needle. Otherwise proceed same as in etching on metal and stone, making an edge of modelling wax around the surface to be etched and pouring on the acid, which consists, in this case, of sulphuric acid 1 part, to which 5 to 6 parts of water are added. It acts very quickly. The lines turn a deep black. If brown lines are desired, dissolve 1 part of silver nitrate in 5 parts of water, etch for a short time, and expose the article for a few hours to the light, until the design turns brown. Very often etchings in ivory are gilded. For this purpose, fill the etched patterns accurately with siccatives, using a writing pen, dry, and dab on gold leaf. After a few hours remove the superfluous gold with a wadding, and the design will be nicely gilded. Etched ivory articles present a very handsome appearance if they are first covered with a silvery gloss, the design being gilded afterwards. For the former purpose the etched object is laid in the above described solution of silver nitrate until it has acquired a dark yellow colour. Then rinse it off in clean water and, while still moist, expose to direct sunlight. After 3 to 4 hours the surface becomes entirely black, but will take on a fine silvery lustre if rubbed with soft leather.

HYDRAULIC BRAKE FLUID FOR AUTOMOBILES

The liquid compressant used in the hydraulic brakes of the modern auto consists of equal parts of denatured alcohol and castor oil. The alcohol thins the oil and acts as an anti-freeze. The castor oil lubricates the piston and is the fluid through which the pressure is transmitted.

SWEET POTATO MORABBA

Sweet potato	1	seer.
Sugar	1	„

Clean the sweet potatoes and allow them to boil in water. When well boiled, the water is drained off and the skin of the potatoes taken off with the hand. These are then cut out in lengths of 2 inches and incisions are made on them with a fork. Now prepare a thin syrup with sugar and proportionate amount of water and when boiling drop these pieces into it. Cook with stirring and take care that the pieces are neither mashed nor broken.

The morabba is very delicious and at the same time wholesome. These may even serve as tiffin.

"SOLDER" GLASSES

A group of very soft glasses have recently been developed at the B.T.H. Research Laboratories by means of which 2 pieces of glass can be "soldered together without distortion" (Sci. Prog., 1948, 36, 714). These solder glasses, as they are popularly termed, are lead borate glasses whose resistance to weathering has been improved by the addition of zinc oxide. By comparison with other types of glasses, the temperature at which they become soft is low, usually well below 460°C. A solder glass with a suitable coefficient of expansion has been successfully employed to join the soda-lime-silicate bulb in miniature radio valves.

The solder glasses can also be employed to seal mica to metal or glass, as well as metal to glass. With the aid of this technique, a piece of soda glass tubing has had a mica window sealed on to one end, a glass plate on to the other, and a sheet of nickel-chrome-iron alloy sealed across the middle to form a diaphragm.

—Journal of Scientific & Industrial Research

POLYTHENE SAFETY JUGS

The safe handling of corrosive liquids has always been a serious problem in almost every factory Hitherto, jugs, buckets and other vessels have been made of rubber, guttapercha, phenolic resins, procelain or earthenware, but none of these materials has been entirely satisfactory. Rubber and gutta percha both become brittle as they age, while phenolic resins, porcelain and earthenware are inherently brittle and may fracture on impact.

Searching for a satisfactory solution of the problem was undertaken by Major Johnson of the Mond Nickel Company Limited, and the new safety jug developed by him was the outcome of an entirely new approach to the subject.

The new type jugs are fabricated from Polythene, a thermoplastic material which in addition to its light weight (s g. 0 91) possesses the property of chemical inertness to most acids and alkalies. It has the further advantage of being shock proof and non-brittle. Polythene can also be welded and this method of fabrication is used extensively in the manufacture of the new safety jugs. Two types of jugs are manufactured by Rediweld Ltd., under exclusive licence from the Mond Nickel Company Limited.

IMPROVED FILTRATION

Improved methods of filtration, which give a definitely better production, have been adapted for the industries demanding absolute cleanliness by Aerox Ltd., of Hillingdon, Glasgow.

This company has already done a very considerable amount of work on industrial filtration, using porous ceramics, as the filtration medium. In recent research the company has concentrated on the problem of moving sterile liquids by compressed air which is not itself necessarily sterile. In some instances the air used for compression might be highly charged and undo all the earlier work on the product itself.

To overcome this danger, the manufacturers have perfected a filtration system whereby the compressed air used as the motivating medium is rendered completely sterile. The process is a mechanical separation one in which the filtration element is a porous ceramic so fine that it is capable of holding back the most minute bacteria. Tests carried out in breweries, for instance, after installation of the system have shown the product to be 100 per cent. sterile.

While research work has been done recently on beer, the system is of value for pharmaceuticals, chemicals and all liquid products where 100 per cent. sterility is a necessary condition for efficient use.

—Chemical Products.

APPARATUS FOR REMOVAL OF BACTERIA FROM LIQUIDS

Bacteria are removed from liquids or gases by contact with an anion-active material which is, or has been, subjected to a high potential direct current. A suitable material is a formaldehyde condensation product of guanidine and urea. Voltages of up to 2,000 may be used with a current of 1 milliampere. In an apparatus for the removal of bacteria the anion-active material is housed in a glass or porcelain vessel (if a metal container is used it should be lined with glass, rubber or porcelain) between two layers of glass wool with glass beads surmounting the top layer. The potential is applied between two platinum electrodes. The anion-active material may be activated or regenerated with sodium or potassium carbonate or hydroxide.

—Manufacturing Chemist.

FORMULAS, PROCESSES & ANSWERS

DEVELOPING SOLUTION FOR PAPERS, FILMS AND PLATES

3632 M.M., Dhampur—Desires to have a good recipe of developing solution for films and plates.

Distilled water (at 50C.)	16	oz.
Elon	45	gr.
Sodium sulphite, Desiccated	1½	oz.
Hydroquinone	175	gr.
Sodium carbonate, Desiccated	2¼	oz.
Potassium Bromide	27	gr.
Distilled water, to make	32	oz.

Dissolve chemicals in the order given.

For papers, dilute 1 to 2 and develop about 45 seconds at 70°F. For films and plates dilute 1 to 1 and develop about 4 minutes in a tray or 5 minutes in a tank at 68°F. (20°C.).

TRANSPARENT PAPER VARNISH

3440 S.M.D., Ambala — Wishes to have formulas of preparing transparent paper varnish.

I

Sandarac	50	tolas.
Mastic	20	„
Camphor	1	tola.
Turpentine	2½	oz.
Ether	2	„
Rect. spirit	2	„

Macerate the ingredients for several weeks until fully dissolved. The result is a limpid, colourless, brilliant varnish, which is not brittle quickly.

II

Copal	3	oz.
Camphor	1½	dr.
Turpentine oil	12	oz.
Oil of lavender	3	„

Dissolve the copal and camphor in the oil of turpentine and then add the oil of lavender.

BAR SOAP

3451 M.L.R.N., Kanpur—Desires to know a formula and process of making bar soap.

Tallow	50	seers.
Groundnut oil	20	„
Rosin	30	„
Caustic soda lye of 36°Be	50	„

Saponify rosin by 10 seers of caustic soda and 10 seers of extra water. When saponification is complete, add the other oils and the rest of caustic soda and boil after boiling method. When complete saponification is assured the soap is transferred into the crutching pan and mixed with sufficient water, to suitable consistency.

This bar soap may by cheapened by the addition of silicate which may be stirred in the boiled soap after the emulsion is complete. Sometimes, silicate settles below being heavier, care should be taken to stir the silicate till the whole soap becomes perfectly cool and thick. If treated with silicate the silicate should be mixed with 10 per cent caustic soda lye extra and added to the soap. Soap stone powder or china-lay may also be added in the soap but in that case, the soap will be heavy and opaque.

BLANCO

3471 C.R.G., Calcutta—Wants to have formulas of bianco, spirit of camphor, and rose oil.

Whiting	74	parts.
Glue	1	part.
Water	25	parts.

The water is warmed to about 176°F and powdered glue is stirred in until dissolved. The whiting is then added slowly with constant stirring after the source of heat has been removed and to each 100 lbs. of mixture 8 oz. of sodium salicylate are added to prevent decay of the glue during subsequent storage. When the paste is smooth and uniform it is placed in warm moulds and after cooling the cakes are removed and packed.

SPIRIT OF CAMPHOR

Camphor	5	oz.
Rectified spirit	1	quart.

Dissolve.

ROSE OIL

This celebrated perfume is the volatile essential oil distilled from the flowers of some varieties of rose, especially the red rose named Rosa Damascena.

The flowers are gathered before they commence to open, in the early morning just before sunrise, and the picking continues till ten or eleven o'clock, or on cloudy days during the whole day, as it is important that the roses should not be picked when the sun's heat is on them. A garden of an acre when well planted will yield about 100 pounds of flowers every day for three weeks. The roses are carried to

the distilleries, which are very numerous and distilled as quickly as possible. However, if the flowers come in too quickly they are sometimes left for twenty-four hours before being distilled, the resulting oil being impaired in value. The distilleries are primitive buildings, sometimes little better than wooden sheds. On one side the stills are kept in rows. These are copper alembics about 3 to 5 feet in height, resting on a furnace built of bricks. The average content of each still is about 20 gallons, the charge usually being 10 kilos of flowers and 75 litres of water.

The condenser is a straight or worm tube passing a vat of water, into which cold water continually runs. A brisk fire is kept up for an hour to an hour and a half, and when 10 litres of liquid are obtained the fire is drawn. At times 15 litres are distilled over, but the result is an otto consaining a larger amount of stearoptene. The still is then opened and the spent petals, or rather flowers, for the green plants seldom separated are thrown away, and the residual hot water is returned to the still with cold water to make up the 75 litres, with a fresh charge of flowers. This operation is repeated until, as a rule, 40 litres of rose water have been collected. These 40 litres are now distilled, and the first 5 litres are collected in a longnecked flask. The residual 35 litres are used for distilling fresh flowers. The 5 litres distilling over the cloudy, and the oil drops gradually rise and collect in the neck of the flask. When it has all risen, it is removed by a small tin funnel with a tiny orifice for the water to be drawn off. The yield is variable, a warm humid spring with intervals of strong sunshine being more favourable than an un interrupted hot dry season.

HAIR CURLING SOLUTION

3593 C.R.G., Calcutta—Wishes to have recipes of hair curling solution, pimple lotion etc.

Ammonium carbonate	4	dr.
Strong solution of ammonia	2	"
Mucilage of acacia	43	gr.
Alcohol (70 p. c.)	2	fl. oz.
Rose water, sufficient to produce	20	" "

Mix, moisten the hair thoroughly with a little of the liquid and adjust lightly; it will curl as it dries. The best results are obtained if the hair be first washed with a little soft-soap and water containing a few drops of solution of ammonia.

PIMPLE LOTION

Borax	30	grams.
Potassium chlorate	120	"
Alcohol	30	"
Glycerine	60	"
Rose water	760	"

Mix and keep in a stoppered bottle.

SOLID BLOCK DISINFECTANT

3670 S.V., Lucknow—Wants to have a good recipe of solid block disinfectant and pain balm.

Tallow	7½ lbs.
Rosin	1½ "
Light creosote oil	9 "
Naphthalene	1 lb.
Caustic soda	1 "
Water	2½ lbs.

Melt the tallow and rosin in a cast iron pan. In a separate vessel dissolve the caustic soda in water.

Now add the creosote in the melted tallow and slowly stir in the caustic soda solution. When jelly like mass is obtained remove the pan from the fire and incorporate the naphthalene in the form of fine powder. Spread the mass uniformly on a stone table and allow to harden. Then cut it into small cubes with a knife.

PAIN BALM

Yellow vaseline	44	parts.
Methyl salicylate	10	"
Cajuput oil	2	"
Eucalyptus oil	2	"
Menthol	2	"
Wool fat	20	"

Mix thoroughly by trituration and put in wide mouthed bottles.

MOTOR GREASE

3693 H.S., Bombay—Wishes to have recipes of motor grease and automobile wax paste.

Take 10 lbs. quicklime, slake well with water and sieve free from grit, stir in 30 lbs. rosin oil, and allow to stand for 12 hours. Then heat to 240°F stir well until a good homogeneous mass is produced. Then allow the mass to cool.

By heating rosin grease with rather more oil a clear, transparent, jelly-like mass can be produced.

AUTOMOBILE WAX PASTE

(A)	Carnauba wax	20	lbs.
	Beeswax	13	"
	Montan wax	7	"
	Stearic acid	6½	"
(B)	Turpentine oil	7	gallons.
	Naphtha	7½	"

Triethanolamine	[illegible]	gallons.
Boiling water	7 to 8	

Melt the ingredients under (A) at 90°C and then add the triethanolamine stirring constantly. Add the ingredients under (B) slowly and then the boiling water. Stir rapidly till the emulsion is formed and then slowly till cold.

REMOVING INK STAINS FROM MARBLE

3361 F.I.P., New Dehi — Wants to have formula and process of removing ink stains from marble floor.

Dissolve ½ oz. of butter of antimony and 1 oz. of oxalic acid in 1 pint of rain water; add enough flour to bring the mixture to a proper consistency. Lay it evenly on the stained part with a brush after it has remained for a few days wash it off and repeat the process if the stain be not wholly removed.

POULTRY FOOD

I

Maize meal	45	parts.
Bran	20	,,
Middlings (coarse wheat powder)	15	,,
Meat and bone meal	5	,,
Dried skim milk	4	,,
Extracted soyabean meal	5	,,
Salt	½	part.
Cod-liver oil	1	,,
Ground limestone	2	parts.
Steamed bone flour	2	,,
Ground charcoal	½	part.

Mix.

II

Wheat bran	6	parts.
Bajra meal	8	,,
Maize meal	8	,,
Gram	3	,,
Meat and bone meal	1	part.

Mix.

CHOCOLATE PEANUT BARS

Sugar	3	lbs.
Corn Syrup	3	,,
Water	1	pint.

Cook to 240°F then add 8 pounds of roasted peanuts, and cook for 10 minutes. Remove from fire, and roll out on slab. Cut into small pieces, and then dip in chocolate.

CHUTNEY

Gur	1	seer.
Green ginger	1	,,
Garlic	1	,,
Raisins stoned	½	poa.
Chillies	4	chs.
Mustard seed	½	seer.
Vinegar	q. s.	

Boil the gur to a syrup in one seer of vinegar. Pound the other ingredients and mix them together with the syrup in the other 4 seers of vinegar. Put it into a large jar and keep it out in the sun for a fortnight.

SPARKLERS

3704 G.S., Allahabad — Wishes to have formulas of making sparklers and magic serpent.

Fine steel filings	12	parts.
Fine aluminium powder	1	part.
Potassium perchlorate	6	parts.
Dextrin or gum arabic	2	,,
Water to suit.		

The steel must be protected from corrosion with paraffin. The gum should be made of the consistency of mucilage. Mix the ingredients thoroughly and add gum solution until a mixture is obtained that will adhere to the wires when they are dipped into it. This varies in different sections and with different runs of ingredients. In practice, bunches of wire are dipped at once and slowly withdrawn in a current of warm, dry air which causes the mixture to adhere evenly.

MAGIC SERPENT (BLACK)

Naphtha pitch	10	parts.
Linseed oil	2	,,
Fuming Nitric acid	7	,,
Picric acid	3½	,,

Reduce pitch to fine powder; add linseed oil and rub in well; add the fuming nitric acid, little at a time. Allow to cool for one hour. Wash several times with water, the last time allowing the mass to stand in the water for several hours. Thoroughly dry; powder fine and add picric acid, rubbing it in well. Moisten with gum arabic water and form into pellets.

MAGIC SERPENT (WHITE)

Fuse in a crucible equal parts by weight of yellow prussiate of potash and flowers of sulphur; it is advisable when the heat cannot be well regulated to include a little carbonate of potash. Lixiviate the mass with water, and filter; the filtrate will be sulphocyanide of of potassium, which, upon being added to a solution of mercury, dissloved in nitric acid, gives a copious precipitate of sulpho-cyanide of mercury. Collect this, wash well with water, and dry; roll it out and cut into pieces of desired sizes and dry.

SILVERING MIRRORS

Silvering of glass is now-a-days carried out by spraying with a mixture of silver nitrate 3 oz., aqueous ammonia 3 oz., and water 128 oz. and a reducing solution comprising a salt (sulphate) of hydroxylamine 2½ oz., aqueous ammonia 1 oz., and water 100 oz. and 2 oz. of glyoxal in 1 gallon of water.

BLACK WRITING INK

3717 R.C.P.S., Hoshiarpur—Wants to have a recipe of black ink powder.

Powdered gallnuts	16	parts.
Gum arabic	8	,,
Cloves	1	part.
Sulphate of iron	10	parts.

Put into an earthenware or glass vessel, cover with 100 parts of rain or distilled water, and set aside for 10 days or 2 weeks, giving an occasional shake the first 3 or 4 days. Decant and bottle for use.

INK POWDER

Methylene blue	25	oz.
Methyl violet	5	,,
Potassium dichromate	2	,,
Soda ash	3	,,
Sugar	2	,,

Pulverize and mix.

CELLULOSE LACQUER

3724 R.K.J., Jwalanagar—Wishes to have a good recipe of cellulose lacquer.

Scrap celluloid	5	parts.
Acetone	20	,,
Butyl acetate	15	,,
Ethyl alcohol	12	,,
Ethyl acetate	15	,,
Benzol	28	,,
Butyl phthalate	1	part.
Hexalin	4	parts.

Mix.

SAND AND EMERY PAPER

3738 W.C.L., Bombay—Desires to know a process of making sand and emery paper.

The old process of making emery papers and cloths of all kinds were to coat any convenient cloth or paper with glue and then to sprinkle on it an excess quantity of emery powder whilst the glue is still hot. The glue is then allowed to set and the surplus abrasive is removed by inverting the paper or cloth and tapping it gently.

At the present day, mechanical coating appliances are employed in which a band of paper or cloth, travelling [illegible] a series of rollers in such a manner that the glue applied to its upper surface is spread uniformly over the cloth or paper. The band next passes beneath a hopper from which flows a steady stream of emery powder (varying from 11 to 24 mesh according to type of article required), in rather larger quantity than is needed to coat it. The band of paper or cloth is then carried over further rolls and cross sticks, during which movement the excess of abrasive falls away and a second coating of glue is applied to the band. The paper or cloth then travels through a long drying chamber, heated by a current of air, and is afterwards wound on rolls As each roll is filled it is taken off the winding machine and removed to the stove, where it is kept until the glue hardens after which it is cut into pieces of the requisite size and shape.

BLUE-BLACK INK FOR FOUNTAIN PEN

3762 S C S., Allahabad—Wants to have a formula and process of making blue-block fountain pen ink

Tannic acid	2½	oz.
Gallic acid	1	,,
Ferrous sulphate	3½	,,
Hydrochloric acid (dilute)	2½	fl. oz.
Gum arabic	2	oz.
Carbolic acid	75	grs.
Phenol blue	½	oz.
Distilled water to make	100	oz.

Dissolve the tannic and gallic acids in 5 oz. of warm water Dissolve the ferrous sulphate and gum arabic in about 20 oz cold water. Add the hydrochloric acid and immediately mix the two solutions. Add the carbolic acid, phenol blue and sufficient water to produce 100 ounces. Keep aside for a fortnight; then filter and bottle.

DEPILATORY CREAM

3766 S V, Lucknow—Wants to have processes and formulas of preparing depilatory cream, chalk crayons etc.

Barium sulphide	30	grms.
Atropine	5	,,
Spermaceti	100	,,
Distilled water	200	,,
White petrolatum	300	,,

Melt over a water bath and mix and put in pots.

This cream can be used as depilatory or can be applied every day for 20 minutes to stop the growth of unwanted hair.

[illegible]

Plaster of Paris	[illegible]	parts.
Precipitated chalk	50	,,

Water sufficient to make soft mass.

Mix the plaster with the chalk and add sufficient water to make mass. Then pour into gun metal moulds well oiled. Allow the mass to set and then take out.

WOOD PRESERVATIVE

Sodium dichromate	4	parts.
Arsenious oxide	1	part.
Copper sulphate	3	parts.

Mix in powders. When required for use take 6 oz. of this powder and dissolve in it 5 pints of water. Dip the wood to be preserved in the solution for 6 to 12 hours. Then take out and dry.

BLACK CYCLE ENAMEL

3878 G.S., Madras — Wants to have a formula of black cycle enamel.

Ground button lac	30	lbs.
Gum sandarac	10	,,
Castor oil	½	lb.
Aniline spirit black	2	lbs.
Methylated spirit	12	gals.

Dissolve the gums in the spirit, then add the black and castor oil, stir well and filter.

POLISHING STICK

3783 K.C.D., Bombay—Wants to have a formula of polishing stick.

Precipitated silica	14	lbs.
Finest emery flour	14	,,
Tallow	21	,,
Crude oleic acid	7	,,

Melt the tallow and oleic acid, stir in the emery and silica, and mould into sticks.

GUT BLEACHING

3785 M.A.J., Samalkot—Wishes to have a good process of bleaching gut.

Gut is usually bleached by sulphuration. The procedure is as follows:—

When sufficiently damp, the pieces are next exposed to the fumes of sulphur, in a chamber about 5 feet square and 6 feet high. They are first strung on sticks, and if not sufficiently moist they are sprinkled over with water from a brush; they are then suspended across the upper part of the chamber to the number of about 100 bundles. About one pound of flowers of sulphur is then put into an earthen dish placed on the floor of the room, and upon this red-hot cinders are laid; the door is then quickly closed, to retain the sulphur fumes within the apartment and every aperture is secured by luting or by glueing pieces of paper over them. After a few hours the door is opened and the fumes allowed to escape when the pieces are found to be bleached and deprived of all objectionable odour. While still damp, they are twisted into banks, packed with camphor, and are then ready for market.

[illegible]

[illegible] A.P.W., Bombay—Desires to know the process of melting glass.

The raw materials for a particular kind of glass are first of all reduced to fine powder and mixed in the manner as explained above. With this mixture cullet or broken glass which is to be remelted is now incorporated. The resulting mixture is then placed in hot melting pots in small quantities at a time until the crucible is almost full of molten material. The actual melting usually occupies 10 to 12 hours, but depends on the quantity to be made and on the type of furnace used. There is a large evolution of gases during this operation, and these form a froth or scum which must, from time to time, be ladled from the surface. Fireclay rings are placed on top of the molten glass or metal when open pots are used, these rings serving to collect the scum or gall, and facilitating the operation of clearing the surface of the glass.

When the frothing has ceased and the scum has been removed, the glass must be refined or planed. This may be accomplished in various ways: One consists in throwing in potatoes or apples, or stirring with a strip of green wood so as to effect a reduction of any matter which may be removed in this manner, and also to produce a further volume of gas which will help in the stirring of the molten glass. The usual method of planing, however, consists in stirring the glass with a fireclay cylinder attached to a long iron rod. During the refining process it is necessary that the glass should be very intensely heated, so that it is very fluid and mobil; its temperature sinks gradually during the stirring, and towards the end of the process the glass is quite viscous. The glassmaker draws trials or test portions from the furnace and examines these; when they show that the glass is clear and can readily be drawn into long threads, the stirring is stopped, and the glass is allowed to cool still further until it is sufficiently viscous for use.

The melting of optical and of most other special glasses is effected in closed pots, the stirring of which is difficult and sometimes impossible. Such glasses must therefore be broken up, and the cleanest fragments selected and remelted, in order to obtain the best results.

—BRIEF QUERIES AND REPLIES

uestions of any kind within the scope of Industry are invited. Enquiries or replies from our perts will be published free of charge in serial order. Questions are replied by post on receipt As. 8 stamps for each question. Subscribers outside India are requested to send two iternational Reply coupons for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.

1602 M.A., Khargpur—Following is the pross of manufacturing hair dyeing oil: Take seers sesamum brayed to a paste, 5 seers ıblic myrobalan free from seeds and bruised, d 10 seers sesamum oil. Put the three ingreınts together in an iron vessel and place in sun for one month. Strain out only 5 seers the sesamum oil. Leave aside for one month; ain out again 5 srs. of oil and put in third and fresh lot of 5 srs. of oil. Repeat operations for six months. Then strain the ıole of the oil and mix together with the mer quantities. Put in a covered vessel nla oil prepared in this way serves as a good ir dye. Smear the head with it every day lf an hour before bath. The hair will be dyed ıck and no grey hair will be noticeable.

1603 M.S., Sukkur—Hindi equivalent of ms is not available. Gum neem, gum babool :., are not used in manufacturing varnish. thopone is not compound, it is a separate ineral used for precipitated chalk.

1605 S.C., Allahabad—You may advertise in wspapers.

1606 R.L.B., Patnagarh—You may consult anufacture of Disinfectants and Antiseptics iblished from this office, price Rs. 3-7 includg postage. As regards ink you may consult anufacture of Ink published from this office, ice Rs. 3-7 including postage. Chemicals may had of Allied Agency, 16, Bonfields Lane; ılcutta Chemical Co., Ltd., 10, Bonfields Lane; ıd B. K. Paul & Co., Ltd., 1-3, Bonfield Lane; l of Calcutta.

1607 H.A., Lucknow—Refer your query to nited Kingdom Trade Commissioner, 1, Harngton Street, Calcutta; American Trade Comissioner, 9-10, Esplanade Mansion, Calcutta; msul-General for France, Flat 26, Park Manons, Park Street, Calcutta.

1608 M.A.J., Samalkot—Process of bleaching it will appear in Formula Section in due urse.

1609 A.C., Delhi—For establishing business lation with some firms you should advertise newspapers.

1611 V.R.R., Karjat—For mica scraps you may enquire of A. K. Nag, Giridih, Hazaribagh; B. N. Daw & Sons, Kodarma, Hazaribagh and Dawn & Co., 11, Portuguese Church Street, Calcutta.

1612 R.S.P., Forbesganj—You may refer your enquiry regarding trade mark to Patent and Trade Mark Corporation, 40, Chittaranjan Avenue, Calcutta.

1613 R.P., Ranchi—For imitation gold and ornaments thereof enquire of New Indian Rolled & Carat Gold & Co., 1, College Street, Calcutta.

1617 S.L.V.P., Sattur—Process of manufacturing menthol will appear in Formula Section in due course.

1618 O.S., Dharmapuri—Address of Allied Photographics Ltd., is 22, Ballygunge Park, Calcutta. Address of Ilford-Selo (India), Ltd., is 15, Central Avenue, (South), Calcutta. For their Madras addresses write to them direct.

1619 S.S.S., Faizabad—Addresses of seeds merchants of foreign countries are not available. You better enquire of United Kingdom Trade Commissioner, 1, Harrington Street, Calcutta; Consul General for Norway, Imperial Chambers, Wilson Road, Ballard Estate, Bombay; Consul General for Sweden, Shangrila, Carmichael Rd., Bombay; Consul General for France, Flat 26, Park Mansion, Park Street, Calcutta; Consul General for Belgium, Morena House, 11, Carmichael Road, Bombay.

1620 K.S., Goalpara—For honey enquire of Bhan Brothers Ltd., Srinagar; Kashmir Honey Stores, Udhampore and Kaulas Reliable Seed Farm, Srinagar; all of Kashmir.

1623 J.M.O.H., Ajmer—Vide No. 1619 above. For foreign books write to Thacker Spink & Co. (1933), Ltd., 3, Esplanade East; W. Newman & Co., Ltd., 3 & 4, Old Court House Street and Standard Literature Co., Ltd., 13-1, Old Court House Street; all of Calcutta.

1624 D.S., Bangalore City—For tallow enquire of Indian Tallow Supply Co., 21, Tiretta Bazar Street, Calcutta.

[illegible] T.U.C., Calcutta—You may start a soap factory with Rs. 5,000. It is not possible to start plastic industry with Rs. 5,000. An article on plastic industry appeared in December 1948 issue of Industry.

1629 L.R.B., Bombay—Process of manufacturing iron slates will be found in Manufacture of Slate published from this office.

1630 K.C.M., Kanpur—Process of manufacturing ink powder, writing ink, ink tablets etc. will be found in Manufacture of Ink published from this office, which you have already got. Tablet making machines may be had of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta and Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

1631 A.W.M., Sukkur—You may refer your query to the Geological Department of your Government.

1634 H S M.C., Gulberga—Disinfectant fluid does not contain naphthaline. Indian Soap Journal is published from 10, Clive Row, Calcutta.

1638 P.C.C., Ajmer—No machine is required for manufacturing beedi.

1641 K.R., Chingleput—Process of manufacturing spectacles frame, safety pins, etc. will appear in Formula Section in due course.

1642 O.S.A., Faizabad—Match making machinery may be had of Harima Engineering Works, 69-1, Belgachia Road, Calcutta and Standard Machinery Co., 86B, Netaji Subhas Road, Calcutta.

1643 R B.A., Lucknow—Hertolan may be had of Calcutta Chemical Co., Ltd., 10, Bonfield Lane, Calcutta and B. K. Paul & Co., Ltd., 1 & 3, Bonfield Lane, Calcutta.

1644 C.L.C., Jhansi—Sheet metal working machines may be had of Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta. For match making machines vide No. 1642 above.

1645 D.H.B., Mirahawatte—For eyelet making machines enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1646 M.P.A.P., Motihari—Ice cream making machines may be had of Refrigeration & Air Conditioning Industries Ltd., 34, Ezra Street, and Refrigerators (India), Ltd., 59C, Park St., Calcutta.

1648 J.H.S., Surada—For corrugated asbestos sheets enquire of Buher & Co., 6 & 7, Netaji Subhas Road, Calcutta and Bells Asbestos & Engineering (India) Ltd., 8, Netaji Subhas Road, Calcutta.

1650 E.M.M., Aruppukottai—Process of manufacturing soap will be found in Manufacture of Soap published from this office, price Rs. 4/7/- including postage. Soap making machines may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta.

1651 S.N.G., Calcutta—We have no book on tablet making. For a book on tablet making enquire of Standard Literature Co. Ltd., 13/1, Old Court House Street, Calcutta.

1652 C.I.A., Mauritius—For jewellery enquire of the following firms: P. C. Auddy Bros., 126A, Bow Bazar St.; R. M. Malakram Sons, 214, Bow Bazar St., and Rakhal Chan Dey, 121, Bow Bazar Street; all of Calcu For calendars enquire of Calendar Mfg. Post Box 6734, Calcutta 7, and Orie Calendar Mfg. Co., Moti Jheel, Dum D Bengal.

1653 C.S., Kandi—Rosin need not be fined for manufacturing varnish.

1654 M.D.P., Kanpur—For machines quired for plastic industry enquire of Alfr Herbert (India) Ltd., 13/3, Strand Road, C cutta.

1655 V.C.L., Jodhpur—For chemicals e quire of Kirkpatrick & Lander Ltd., 108, Ho Street, Glasgow C2, and Harrison Clark Lt 891, Dickenson Rd., Longsight, Manchester 13

1656 V.S., Sakri—For packing papers e quire of Raghu Nath Dutt & Sons, 64, Harr son Road and United Paper House, 31, Jackso Lane; both of Calcutta.

1661 P.R.M., Rajnandgaon — For ice fru plant enquire of Refrigeration and Air Cond tioning Industries Ltd., 34, Ezra Street an Rerigerators (India), Ltd., 59C, Park St.: bot of Calcutta. Slide screen making machine may be had of Photographic Stores & Agenc Co., Ltd, 154, Dharamtala Street and Joh Dickinson & Co., 6, Clive Row; both o Calcutta.

1662 G L., Hyderabad—For jute threa making machines enquire of McLeod & Co., Ltd. 28, Dalhousie Square, Calcutta.

1666 S.G., Fatehpur—Perfumes may be had of Ghose Bros, 50, Ezra Street and Paradise Perfumery House, 7, Colootola Street; both of Calcutta.

1668 A.N.C., Bansberia — From asbestos tiles, shinghles, electrical insulations, insulation of steam pipes and boilers, asbestos paints, various asbestos moulded articles, etc. are made. An elaborate article on asbestos and asbestos manufacture appeared in May, 1944 issue of Industry.

1670 L.H.M., Cuttack — Mantle knitting machine may be had of W. H. Brady & Co. Ltd., Mercantile Bldgs., Lall Bazar Street, Calcutta.

1674 M.P., Madras—For pill making machine enquire of Dr. Bose's Laboratories Ltd., 45, Amherst St., Calcutta.

1676 B.R V., Mandla—Calcium carbide is not manufactured in India. For carbide enquire of

Shaw Wallace & Co., Bankshall Street, Calcutta and Radha Kanto Dass & Sons Ltd., 211, Old China Bazar Street, Calcutta.

1677 R.N.M., Bamtapur—We are not aware whether Prof. Sachin Nag has arrangement for giving practical training.

1678 B.B., Delhi—Refer your query to the Controller of Exports, New Delhi. You cannot do business with African businessmen by V. P. P. system. As regards Burma and Ceylon you may send goods by V. P. P.

1679 S.G.P.S., Nagpur—Oil is extracted from orange peel and vinegar is made from orange juice. For an expert you should advertise in newspapers.

1680 H.W.H., Delhi—Following is a list of expanded metal manufacturers: Calcutta Expanded Metal Mfg. Co., 1, Jagmohan Mallick Lane, Calcutta; Chunilal & Co., 47, Abdul Rehman St., Bombay; Yahya & Co., 109-111, Abdul Rehman Street, Bombay and Expanded Metal Dept., Expanmetal House, 91-93, Abdul Rehman Street, Bombay 3.

1682 D.N.D., Mathura—An article on plastic industry appeared in December, 1948, issue of Industry. For plastic machines enquire of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta. Chemicals and raw materials may be had of the above firm.

1686 R.N.A., Kotkapura — For droppers enquire of Saini Rubber Co. Ltd., Khajur Road, Karol Bagh, New Delhi.

1687 P.G.M., Karimganj — For motor cars and trucks you may enquire of Allen Berry & Co., 24, Park Street, Calcutta; Austin Distributors Ltd., 19, Chowringhee Road, Calcutta, Ford Motor Co of India Ltd., 2, Justice Chandra Madhab Road, Calcutta, International Tyres & Motors Ltd., 2 Rowland Road, Calcutta; G. Mckenzie & Co. (1919), Ltd., 208, Lower Circular Road, Calcutta; French Motor Car Co. Ltd., 234-3, Lower Circular Road, Calcutta. For G.E.C. Radio enquire of General Electric Co. (India), Ltd., Chittaranjan Avenue South, Calcutta. For Chicago Radio enquire of Chicago Telephone & Radio Co., Ltd., 25, Chowringhee Road, Calcutta.

1688 S.N., Chandausi—Following is a list of cycle parts manufacturers: Calcutta Frame Manufacturing Co, 6/1A, British Indian Street, Calcutta; Globe Engineering Co, 33/1, Dharamtala Street, Calcutta; Hind Cycle Ltd., Kilachand Devchand Bldgs., 45 57, Apollo Street, Fort, Bombay; India Cycle Manufacturing Co. Ltd., 9, Tiljala Road, Calcutta and Jai Hind Cycle Works, Old Gurgaon Road, Paherganj, Delhi.

1690 L.T.C., Aijal—For American hats enquire of Whiteaway Laidlaw & Co., Ltd., 2, Chowringhee Square, Calcutta. To convert inferior sugar into refined crystalline white sugar it is boiled with water and the syrup is clarified with milk till a perfectly clear syrup is obtained, which is then concentrated by continued boiling till the right consistency is attained. Then it is recrystallised and converted to sugar by means of a centrifugal machine.

1692 N.K.T., Diphu—We have no book on photography. You may however enquire of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta. Photographic materials and accessories may be had of Photographic Stores & Agency Co. Ltd., 154, Dharamtala Street, Calcutta. We are not aware of any such association.

1693 R.K.P.D., Jaithalmandi—For plastic goods enquire of Abdul Kayum Esufally & Bros., 193, Abdul Rehman Street, Bombay 3; Popular Plastic, Ruby House, Opp. Colaba Tram Terminus, Bombay 5, and Rubako Industries, Behramji Mansion, Sir P. M. Road, Bombay.

1694 B.B.L.J., New Delhi—You may start soap industry, manufacture of tinctures and extracts, cardboard box making, etc. with Rs. 10,000/- as initial capital.

1696 A.T.C., Nagpur — Process of sizing twine will appear in Formula Section in due course. Twine winding machines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

1697 H.M.D.Z., Vaniyambadi — For rope and mats write to Calcutta Supply Agency, 8, Canning Street; Jhabarmal Shamsundar, 46/1, Strand Road; S. C. Mullick & Co., 23-1, Harrison Road, and Kartik Ch. Das, Sudhir Kumar Das & Bros., 113, Manohar Das Chowk, all of Calcutta.

1699 D.P.A., Gurdaspur—Reply to your query has already been sent by post.

1700 M.R.J., Jullundur—We are not aware of any thing such as diamond chloride or carbon chloride.

1701 N.H.T.C., Bombay—Process of manufacturing toffee and hair fixo will appear in Formula Section in due course.

1704 A.R., Jodhpur—For cloth printing and dyeing machine enquire of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1705 M.B.S.C., Benares City—For selling goods you deal in advertise in Industry as it is very difficult to suggegst names of firms that will be interestd in articles stocked by you.

1706 R.C., Masulipatam—For trade mark registration you may negogtiate with Dutta & Co., 82, Harrison Road, and Law Morris & Co., 19, Strand Road; both of Calcutta.

1709 A.F.C., Malaya—Process of hydrogenation of oil will be found in Vegetable Oil Industry which you have already got.

1710 S.K.M., Surat—For artificial leather you may enquire of S. Lal Hussain, 75, Bentinck Street and A. C. Mohamad, A. C. House, P15,

[illegible] St.; both of Calcutta. We have no [illegible] book on rubber industry. You better enquire of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East and W. Newman & Co., Ltd., 3, Old Court House Street; both of Calcutta.

1711 W.S.S., Ranchi—Refer your query to the International Correspondence College, New Delhi.

1712 P.R.M., Samastipur — For musical instruments enquire of Calcutta Musical Stores, 5 Lower Chitpur Road and N. B. Sen & Bros., 11, Esplanade East; both of Calcutta.

1713 B.K.B., Calcutta—For block making machines and other equipments enquire of Photographic Stores & Agency Co., Ltd., 154, Dharamtala Street and John Dickinson & Co., 4, Clive Row; both of Calcutta.

1715 S.P.K., Delhi—Process of manufacturing tambul bihar, mukh bilas, etc. will be found in Home Industries published from this office, price Rs. 8/7/- including postage.

1716 S.G.J., Alleppey—American or Australian flour is made from wheat.

1717 N.A., Pudukkottai—Process of manufacturing scented betelnut and coffee powder will appear in Formula section in due course.

1718 M.B., Tuticorin—For vanila and milk powder enquire of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta and Essence and Bottle Supply Agency, 14, Radha Bazar Street, Calcutta.

1720 L.S., Baghana—For brushes you may enquire of Amherst Brush Factory, 12B, Amherst Street; Joe Kalyan & Co., 4, Brojonath Mitra Lane, and Pioneer Brush Factory, 11, Amherst Street; all of Calcutta. For holdalls and other things enquire of Chowdhury & Sons, 18, Old China Bazar Street and Indian Leather House, 78/1, Harrison Road; both of Calcutta Want to be put in touch with the suppliers of glass buttons.

1722 S.M.C., Talegaon—You may start biri making and paper making by hand in your village. These industries have good prospect.

1724 L.M.R., Dacca—Process of manufacturing kimam and pati zarda will be found in Indian Tobacco and Its Preparations published from this office, Price Rs 3/7/- including postage.

1727 M.A.B., Bombay—Refer your query to the Industrial Research Laboratory, 22, R. G. Kar Road, Calcutta for learning soap and cosmetic manufacture.

1731 V.K., Madras—For rubber machine you may enquire of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta and Francis Klein & Co. Ltd., 1, Royal Exchange Place, Calcutta. Process of sheathing wire will appear in Formula section in due course.

1732 A.B., [illegible]—All the chemicals you require may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane and Calcutta Chemical Co. Ltd., 16, Bonfield Lane; both of Calcutta.

1733 M.N.D., Nagpur—Manganese dioxide is prepared by washing and grinding in mills. For ink bottles enquire of Ananta Kumar Ghose & Co., 9, Ezra Street and Bimal Bottle Stores, 130, Radha Bazar Street; both of Calcutta.

1734 M.I., Tiruvettipuram — Process of manufacturing collodion paper will appear in Formula section in due course.

1741 A.C.C.C., Udaipur—You may use absolute alcohol for manufacturing perfumes.

1742 H.C.B., Howrah—Refer your query to the Benares Hindu University Engineering College, Benares.

1743 B.S.M., Tirora—For carbide enquire of Shaw Wallace & Co., Bankshall Street, Calcutta and K. C. Dey & Sons, Ganesh Avenue, Calcutta.

1745 S.G.J., Indore—For carbon paper and typewriter ribbon making machine enquire of Jessop & Co., Ltd., 93, Netaji Subhas Road, Calcutta. For steel container making machines enquire of Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta.

1750 M.V.B.R., Berhampur—We cannot supply you the process adopted by some firms. Glue and other materials are melted on water bath and cast in mould as usual. Process of rubber stamp making will be found in Manufacture of Rubber Goods published from this office, price Rs 3-7 including postage. Practical training will help you much for learning rubber stamp making. For this purpose you may negotiate with B. Goray & Co., 156, Cornwallis Street, Calcutta.

1751 B.N.S., Chapri—We are not aware of any such plant which may replace caustic soda in manufacturing soap.

1752 O.P.S., Delhi—Camphor is used as a plasticiser. Celluloid is soluble in acetone and amyl acetate. After dissolving in the above chemicals you may use alcohol for further diluting it.

1753 T.N.G., Madura—For lace knitting machine enquire of W. H. Brady & Co., Ltd., Mercantile Bldg., Lall Bazar, Calcutta.

1754 B.L.M., Chapra—For zeal thermometer you may enquire of Zill & Co., Princess Street, Bombay.

1755 U.S.P., Rai Bareli—Patent leather generally does not require any polish. Petroleum is motor fuel

1756 R.V.K.N., Coimbatore—For tin cans enquire of Bengal Tin Box Mfg. Co., Ltd., 1, Jadu

Nath Mitter Street, Calcutta and National Sheet & Metal Works Ltd., 38A, Sahitya Parishad St., Calcutta.

1758 A.N.S., Calcutta—Laundry machines may be had of Jessop & Co., 93, Netaji Subhas Road, Calcutta.

1759 N.M., Kanpur—Refer your query to the Controller of Exports, New Delhi.

1761 K.B.H.I., Madhoganj—For typewriters enquire of the following firms: Typewriter Supply Agency, 25, First Carpenter Street, Bombay; Western India Typewriter Co., Hornby Road, Fort, Bombay; National Typewriting Company, Nai Sarak, Delhi and Globe Typewriter Co., 10, Clive Row, Calcutta. Following is a list of type foundries: Agarwal Type Foundry, 83, Pandariba, Allahabad; Lakshmi Type Foundry, Bai-ka-Bagh, Allahabad; Bharat Type Foundry, Lal Darwaza, Sita Ram Bazar, Delhi and N. N. Sanyal & Sons, 28A, Keshub Sen Street, Calcutta.

1764 P.P.F.S.C., Delhi—Address of Registrar of Trade Marks is 17, Prinsep Street, Calcutta.

1765 H.K.S., Dargarband—We do no deal in any machine, we only supply information. For the machine required enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1766 R.G.S., Mandsaur—For photographic goods enquire of Tropico Sensitising Corporation Ltd., 1, Mahanirvan Road, Kalighat, Calcutta. You have to invest at least Rs. 1 lakh for starting a factory for manufacturing dry plates, films and paper, etc. Photographic materials may be had of Photographic Stores and Agency Co. Ltd., 154, Dharamtala Street, Calcutta.

1768 K.R., Kuala Lumpur—For glass bottles of required description enquire of Sree Gobindeo Glass Works, Ramrajatola, Howrah; Victoria Glass Works, Ghoosery, Howrah and Bharat Glass Works Ltd., Belgharia, Bengal.

1769 N.S., Imphal—For soaps of all kinds enquire of Calcutta Chemical Co., Ltd., 35, Panditia Road, Ballygunge, Calcutta.

1770 R.D.G., Alwar—Plastic manufacturing machines may be had of Alfred Herbert (India) Ltd., 13/3, Strand Road, Calcutta. Potato chip making machines may be had of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

1774 K.B., Aranattukara—We cannot vouchsafe opinion regarding respectibility of any firm. You better ask for their bank and other commercial references.

1775 M.N.S., Kanpur—Process of manufacturing lozenges will be found in Manufacture of Confectionaries published from this office, price Rs. 3/7/- including postage. Lozenge making machine may be had of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta. For starting a lozenge factory you have to invest at least Rs. 5,000.

1776 O.S., Dharmapuri—Agent for colgate product is Colgate Palmolive (India) Ltd., Hareen House, Bazar Gate Street, Fort, Bombay. For Ilford films enquire of Ilford-Selo (India) Ltd., 15, Central Avenue, Calcutta.

1780 S.M.R., Madras—Process of manufacturing asafoetida will appear in Formula Section in due course.

1782 M.T.C., Sitarampur—For sodawater bottles enquire of Essence and Bottle Supply Agency, 14, Radha Bazar Street, Calcutta.

1783 P.S.K.M., Karur—Process of flavouring tobacco will appear in Formula Section in due course.

1784 T.R.B.G., Ithalar—For carbon bisulphide enquire of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta.

1786 T.K.M., Limbdi—Process of manufacturing sparkler appears in Formula Section.

1787 V.K.B., Bombay—Following is a list of homeopathic institutions: Dunham Homeo College & Hospital, 63, Upper Circular Road, and Calcutta Homeopathic College & Hospital, 265, Upper Circular Road, Calcutta.

1788 S.R.S., Baroda—An article on candle manufacture appeared in May 1949 issue of Industry. You may manufacture candle on small scale. Process of manufacturing constipation pills will appear in Formula Section in due course.

1792 B.K.P., Salem—Process of manufacturing palmyra sugar candy will appear in Formula Section in due course.

1793 S.C., New Delhi—Process of manufacturing table salt will appear in Formula Section in due course.

1794 S.K.M., Kashipur—Refer your query to the Director of Public Instructions of various provinces of India. You may also enquire of American Trade Commissioner, 8-9, Esplanade mansion, Calcutta.

1795 M.V., Rajahmundry—You may refer your query to the Registrar, Trade Marks, 17, Prinsep Street, Calcutta.

1796 C.S., Patna—Address of Consulate Royal for Sweden is 7, Wellesley Place, Calcutta. As regards Italian Consulate Government has not yet opened any office in India.

1797 G.B., Guntur—The most convenient method of preparing hydrogen is by the action of zinc on sulphuric acid. The zinc is either granulated or cut into clippings; these are inserted in a glass flask or double necked (Woulf's) bottle, fitted with thistle funnel and delivery tube. The acid is diluted with from four to six times its volume of water and added through the thistle funnel. The evolution of hydrogen gas immediately commences, and the acid in the flask rise rapidly in temperature. The gas is collected over the pneumatic

[illegible] apparatus enquire of [illegible] Chemical & Pharmaceutical Works [illegible] Manicktala Main Road, Calcutta.

[illegible] D.N.D., Mathura—Process of removing ink stains will appear in Formula Section in due course.

1799 J.A.J., Karachi—A formula of liquid disinfectant (phenyle) appeared in March 1949 issue of Industry.

1804 T.N.S., Bombay—Process of manufacturing bricks will appear in due course.

1805 I.N.U., Surat—Refer your query to the Ministry of Foreign Affairs, New Delhi. We have no such book on correspondence. You may however enquire of Thacker Spink & Co. (1933) Ltd., 3, Esplanade East, Calcutta.

1806 D.R.S., Kanpur—You may start ink manufacture, soap manufacture, toilet goods manufacture, tobacco preparations such as Kimam, Zarda, etc. For starting a dairy farm you have to invest at least Rs. 25,000/-.

1808 J.C.D., Tatanagar—For lottery tickets you may enquire of Royal Calcutta Turf Club, 13, Russel Street, Calcutta.

1809 R.M.N., Jaunpur—For required engines enquire of the following firms: Balmer Lawrie & Co. Ltd., 103, Netaji Subhas Road; Marshall Sons & Co. Ltd., 99, Netaji Subhas Road and Francis Klein & Co., Ltd., 1, Royal Exchange Place; all of Calcutta.

1810 N.C.W., Ajmer—You may try the following formula: Calcium hypophosphite 45 grm; Potassium hypophosphite 15 grm; Sodium hypophosphite 15 grm; Hypophosphorous acid (30 per cent) 1 c.c.; Glycerine 50 c.c.; Sugar 600 grm; Chochineal q.s.; distilled water to make 1000 c.c. Triturate hypophosphites with water 500 c c until dissolved, add the hypophosphorus acid, filter and wash with water until 540 c.c. of liquid is obtained. To this add the glycerine and sugar and cochineal and dissolve without heat and make upto measure. For preserving gripe water you should use 10 p.c. alcohol.

1811 P.S.B., Ootacamund—Process of making artificial diamond and gems will appear in due course.

1814 M.M., Bankura—Present address of East India Cotton Mills Ltd., is 21B, Canning Street, Calcutta. Address of Bagerhat Co-operative Union Ltd., is 12 Netaji Subhas Road, Calcutta. You may start soap manufacture, ink manufacture, etc.

1815 S.C., Patna City—For gallon drums enquire of Bengal Tin Box Mfg. Co. Ltd., 1, Jadu Nath Mitter Lane, Calcutta and National Sheet & Metal Works Ltd., 36A, Sahitya Parishad Street, Calcutta.

1819 K.N.M., Kanpur—Barbed wire is manufactured with the help of a machine from galvanised wire. For machine enquire of Jessop & Co. Ltd., 93, Netaji Subhas Road, Calcutta. Wire may be had of Balmer Lawrie & Co. Ltd., 103, Netaji Subhas Road, Calcutta.

1821 G.O.S., Ludhiana—For bone crushing machine write to Marshall Sons & Co. Ltd., 99, Netaji Subhas Road, Calcutta. Following is a list of bone mills: Beleghata Bone Mills, [illegible] Baraparitala Road, Beleghata, Calcutta and Chingreehata Bone Mill, 4, Ram Mohan Mullick Garden Lane, Calcutta.

1822 B.B., Dharapuram—You may use oil of lemon with vanilla for flavouring.

1824 D.R.S.M., Chamarajanagar—You may start ink and soap manufacture. You may also take up manufacture of agarbatties.

1826 H.N.C., Dhamgarh—Formulae of cloth stamping paste will appear in Formula Section in due course.

1827 R.E.H.S., Phagwara—Printing machines and parts may be had of John Dickinson & Co., 6, Clive Row and Printing & Industrial Machinery Ltd., Windsor House, 7/1, Bentinck Street, Calcutta.

1830 K.B., Dehra Dun—German addresses are not available at present.

1831 N.B., Calcutta—For textile machines enquire of W. H. Brady & Co. Ltd., Mercantile Bldgs., Lall Bazar, Calcutta. Laboratory apparatus may be had of Adair Dutt & Co. Ltd., Stephen House, 4 & 5, Dalhousie Square, Calcutta.

1836 S.L.M., Calcutta—You may start manufacture of tinctures with Rs. 5,000/- to Rs. 10,000/-. This industry has good prospect.

1838 N.I.C., Kumbakonam—You may start printing ink manufacture with Rs. 10,000/-. This industry has good prospect. You require only grinding and mixing machines which are available in India. There are limited numbers of factories manufacturing printing ink. So there is no chance of keen competition among the manufacturers themselves.

1839 H.L.L., Calcutta—You may refer your enquiry regarding directory of medical practitioners to B. K. Paul & Co. Ltd., 1 & 3, Bonfield Lane, Calcutta.

1840 U.P.S., Ahmednagar—For cement you may write to Harivandas Mohandas & Co., 20-22, C. P. Tank Road, Bombay 10 and Shapoorji Pallonji & Co., 770, Meadows Street, Fort, Bombay.

1841 A.C.C., Jamshedpur—For stencil cutters and oil paint enquire of Kanay Lall Dhar, 11, Swallow Lane and Fotic Lal Seal and Sons, 10, Swallow Lane; both of Calcutta.

1844 B.P.D., Jullundur City—Following is a list of Electricity supply companies: Ahmedabad Electricity Co. Ltd., Ahmedabad; Karnal Electricity Supply Co., Karnal; Murree Electric Supply Co., Murree; Benares Electric Light & Power Co. Ltd., Benares and Cawnpore Electric Supply Corporation Ltd., Sutherland House, Kanpur. An exhaustive list will be found in

Industry Year Book & Directory published from this office, price Rs. 12/- including postage.

1845 K.C.D., Delhi—For embroidery and butta making machines enquire of Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension, Calcutta.

1846 J.R.M., Bikaner—There is no substitute for coconut oil for making soap and hair oil. Vegetable oil may be refined by treating the oil with 1 per cent caustic soda. Detailed information will be found in Vegetable Oil Industry published from this office, price Rs. 3/7/- including postage.

1847 D.B.A., Nasik—Following is a list of ebonite dealers: New Calcutta Stores, 52, Strand Road, Calcutta; Rubber Products Ltd., Dudheshwar Road, Ahmedabad and Western Indian Manufacturers Ltd., Post Box 574, Bombay.

1848 P.D., Kanpur—For bery making machine enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, Calcutta and Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extn., Calcutta.

1850 I.C., Silchar—Amyl acetate may be had of Calcutta Chemical Co. Ltd., 10, Bonfield Lane, Calcutta and Allied Agency, 16, Bonfield Lane, Calcutta.

1851 M.I., Tiruvettipuram—Process of manufacturing Turkey red oil will appear in Formula Section in due course. In manufacturing soap of green colour you should use Fast Light Green, Ultramarine green, Chrome green, Alizarine or napthol green; as regards blue you may use methylene blue, cyanole blue F.F.

1852 T.P.T., Trichur—You may start an enamel factory with Rs. 50,000. We have no other book dealing with enamel manufacture. You may however engage an expert.

1853 V.V.R., Jamshedpur—A good formula of spirit gum will appear in Formula Section in due course.

1854 S.D., Peshawar—You may consult Prospective Industries published from this office, price Rs. 3/7/-including postage. For mould enquire of Small Machineries Mfg. Co., 22, R. G. Kar Road, and Oriental Machinery Supplying Agency Ltd., P12, Mission Row Extension; both of Calcutta.

1855 B.S.O., Ellore—For boot and shoe making machines enquire of Martin & Co., 12, Mission Row, Calcutta.

1858 K.A.S.W.W., Bombay—For a list of exhibitions and fairs write to District Officers. You may consult our journal.

1860 S.R., Raipur—We have no book in Hindi or Urdu. You may however consult Cotton Dyeing and Printing published from this office, price Rs. 3/7/- including postage.

1862 P.N.K., Travancore—We are not aware of any such Doctors' Association that gives Doctor of Honour.

1865 S.M.S., Ambala Cantt.—There is no arrangement for giving practical training on manufacture of ultramarine blue.

1866 P.L.S.C., Bulandshahr—We sell only our publications. For the books required enquire of W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta and Thacker Spink & Co. (1933) Ltd., 3, Esplanade East, Calcutta.

1867 B.D., Sarupeta—For hosiery thans enquire of Hari Hosiery Factory, 18 & 19, Dobson Road, Howrah and Sreeram Hosiery Mills, 110, Dharamtolla Road, Salkia, Howrah. Hosiery machines may be had of W. H. Brady & Co. Ltd., Mercantile Bldgs., Lall Bazar, Calcutta.

1868 K.R.C., Point Pedro—Ornaments are made from base metal then these are gilded by amalgam or electroplating process. Process of electroplating will be found in Electroplating in Practice published from this office, price Rs. 3/7/- including postage. For goldsmith's tools enquire of A. J. Sur & Co., 233, Upper Chitpur Road, Bagbazar, Calcutta.

1870 A.B., Kalahandi—Address of Western India Match Co. Ltd., is Wellesley House, 7, Wellesley Place, Calcutta 1. You may consult Industry Year Book and Directory.

1871 J.S.U., Allahabad—Commercial waxes may be had of Chemical Publishing Co. Inc., Brooklyn, New York, U.S.A.

1872 S.A.D.P., Etawa—You may try the following formula of ringworm ointment: Salicylic acid 320 grain; Benzoic acid 480 grains; Resorcin 240 grains; coconut oil 1 oz; hard paraffin 1 lb. Mix intimately.

1873 K.L.S., Jubbulpore — There is some defect in manufacturing the soft soap. You should not dilute the soap until it is completely saponified.

1874 M.R.P., Bhuj—For particulars please write to the firms direct.

1875 P.D.G., Agra—Paper cutting machine may be had of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1876 S.S.N., Saugor—The provinces of Bihar and C. P. will be suitable for cement, iron &

[illegible] industries. Raw materials for the above industries are available in large quantities.

1879 T.A., Proddatur—Spirit dyes i.e. dyes soluble in spirit may be had of Imperial Chemical Industries (India), Ltd., 18, Strand Road, Calcutta. Venice turpentine may be had of Kaylash Chandra Dutt, 20, Bonfield Lane, Calcutta.

1879 G.K.R., Ballia—We have no book on dye manufacture. You may however enquire of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta and Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

1881 P.S.V., Guntakal—Chemicals required for ink manufacture may be had of Calcutta Chemical Co., Ltd., 10, Bonfield Lane and Banshidhar Dutt, 126, Khengrapatty, Barrabazar; both of Calcutta. Dyes may be had of Imperial Chemical Industries (India), Ltd., 18, Strand Road, Calcutta.

1882 H.G.G.M.C., Calcutta—Technical books you require may be had of W. Newman & Co., Ltd., 3 & 4, Old Court House Street and Standard Literature Co., Ltd., 13-1, Old Court House Street, both of Calcutta.

1883 R.R.C., Jodhpur—For manufacturing catechu you will require boiler and filtering machines which may be had of Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, Calcutta.

1884 S.R.M., Kumbakonam—Process of manufacturing fireworks will appear in Formula Section in due course.

1885 N.N.G., Bolpur—You may consult Home Industries published from this office, price Rs. 3-7 including postage. There is no arrangement for imparting practical training on bakery.

1886 S.L.W., Rajamandry—Spoiled milk cannot be used as wholesome milk. Lens of camera may be tested by its focal length and magnification. Voltage is equal to current into ohm (resistance).

1888 M.C., Calcutta—Process of manufacturing massonite will appear in Formula Section in due course.

1890 N.N.C., Chas—Process of manufacturing soap will appear in Formula Section in due course.

1891 S.V.B., Umreth—For dictionary enquire of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

1892 S.V.S.T.C., Avanashi—Following is the process of manufacturing scented betelnuts. Pulverise several betelnuts. Then mix with sufficient quantity of glycerine so as to moisten the powder. Next add a little pink colour, which should of course be harmless. Lastly add a small amount of menthol, eucalyptus oil etc. to perfume the substance as delicately as possible.

1893 S.L.B., Dehra Dun—Following is a list of match factories: Ambarnath Match Factory, Ambarnath, Thana; Gujrat Islam Match Mfg. Co., Ltd., Kankaria Road, Ahmedabad; New Cambay Match Factory, New Kankaria Tank, Ahmedabad; Western India Match Co., Ltd., Alambazar, Near Calcutta and Hydari Match Co., 150A, Belliaghata Main Road, Calcutta. An exhaustive list of match factories will be found in Industry Year Book & Directory published from this office.

1894 B.S., Berhampur—For ice candy making machine enquire of Refrigeration and Airconditioning Industries Ltd., 34, Ezra Street, Calcutta and Refrigerators (India), Ltd., 59C, Park Street, Calcuutta.

1896 K.Y.B., Hubli—We have no such book.

1898 G.S.V., Khurja—Plastic goods manufacturing machines may be had of Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta.

1899 M.D.C., Calcutta—For transfer label enquire of Signograph Co., Baranagore, Calcutta.

1900 P.E.W., Bulsar—Process of manufacturing black enamel paint for bobbin will appear in Formula section in due course.

1901 M.B.P., Saharanpur—We are not aware of the whereabouts of the agents of Reaves & Sons Ltd., of London.

1902 K.C.J., Kanpur—You may use molasses as binding agent for making balls of eggshape with coal dust. Cowdung will be more convenient binding agent.

1906 J.B.P., Kaithalmandi—For cardboard box write to Bengal Cardboard Industries & Printers Ltd., 165, Cornwallis Street, Calcutta and Cardboard Box Co., 96, Baitakkhana Road, Calcutta. Tin boxes may be had of Bengal Tin Box Mfg. Co., Ltd., 1, Jadu Nath Mitra Lane, Shambazar, Calcutta and National Sheet & Metal Works Ltd., 36A, Sahitya Parishad St., Calcutta.

1907 T.C.S., Lucknow—For potato starch enquire of Allied Agency, 16, Bonfield Lane, Calcutta. For bottles enquire of Ananta Kumar Ghose & Co., 9, Ezra Street and Bimal Bottle Stores, 130, Radha Bazar Street; both of Calcutta. For label printing, poster printing enquire of Art Press, 20, British Indian Street and Calcutta Art Printers, 11, Wellesley St.; both of Calcutta.

1910 S.S.H., Darbhanga—Agricultural implements may be had of Volkart Bros., 8, Netaji Subhas Road and Planter's Stores & Agency Co., Ltd., 11, Netaji Subhas Road; both of Calcutta. Motor accessories may be had of Howrah Motor Co., Ltd., Mission Row Extension and Wellesley Motor Co., 41, Wellesley Street; both of Calcutta.

1911 M.A.P., Tenkasi—Soap making machine may be had of Small Machineries Mfg. Co., 22, R G Kar Road, Calcutta.

1912 Y.B.S., Kurseong—For rice, oil and flour mill machineries write to Balmer Lawrie & Co., Ltd., 103, Netaji Subhas Road; Marshall Sons & Co., Ltd., 99, Netaji Subhas Road, and Volkart Bros., 8, Netaji Subhas Road; all of Calcutta.

1914 S.I.H., Azamgarh—For taking agency of some firms you should write to the firms direct mentioning your experience in the line. You should also advertise in newspapers. You may consult Manufacture of Soap published from this office, price Rs. 4-7 including postage. Flour making machines may be had of Balmer Lawrie & Co, Ltd., 103, Netaji Subhas Road, Calcutta. For registration of firms you may negotiate with Dutt & Co., 82, Harrison Road, Calcutta.

1915 N.C.P., Sonepur—Chemicals may be had of Allied Agency, 16, Bonfield Lane and Calcutta Chemical Co., Ltd., 10, Bonfield Lane; both of Calcutta. Dyes may be had of Imperial Chemical Industries (India), Ltd., 18, Strand Road, Calcutta.

1916 P.K.B., Meerut City—For scissors and razors you may enquire of A. M. Nasiruddin, 60, Canning Street and Mazumdar & Co., 113, Manohar Das Chowk, Barabazar; both of Calcutta. To communicate with any querist write him with number and initials care of Industry when your letters will be duly redirected.

1917 S.P., Karimganj—Thank you for your valuable suggestion. We shall try to publish weekly review of major industries.

1918 J.L., Madras—Following is a list of foreign dealers:—Associated Tobacco Agency, 50, Dharamtala Street; Great Eastern Tobacco Co., 15, Clive Row; Hajee Mohammed Box & Son, 2-12, Grant Street and Hurry Dass Auddy, 1, Chandney Chowk Street; all of Calcutta.

1919 T.R.S., Madras—Refer your query to the Registrar of Joint Stock Co., Bengal, P-29, Mission Row Extension, Calcutta.

1920 R.L.G.C., Lucknow—For the machine you may enquire of Burma Shell Oil Storage & Distributing Co., of India Ltd., Hongkong House, Calcutta.

1924 M.S., Ferozepore—You may add turpentine oil to the shoe polish already dried up.

1925 D.P.B., Bombay—Rare Earth Industry is a book which may be had of Thacker Spink & Co. (1933), Ltd., 3, Esplanade East, Calcutta.

1926 M.L.S., Kanpur—We have no book on photography on glass or mirror and duplicator manufacture. You may however enquire of W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

1927 H.C.C., Jalpaiguri—[illegible] ances enquire of Edward [illegible] Ltd., [illegible] Lindsay Street, Calcutta. Filter paper, [illegible] acid, etc., may be had of Allied Agency, [illegible] Bonfield Lane, Calcutta.

1928 R.B.R., Jodhpur—Following is a list of plaster of paris dealers: Bagri Mining Syndicate, 32, Cross Street; Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane and Indian Mineral Agency, 14-2, Old China Bazar Street; all of Calcutta.

1930 J.G.W., Abu Road—Process of washing china clay will appear in Formula section in due course.

1931 I.S., Tarn Taran—For Japanese machines enquire of Oriental Machinery Supplying Agency Ltd., P-12, Mission Row Extension, Calcutta.

1932 S.R.G.S., Gorakhpur—Process of manufacturing lal anjan will appear in Formula Section in due course.

1936 C.M.S., Vijayavada—You may write to the Head Master, Maharaja Cossimbazar Polytechnic Institute, 3, Nanda Lall Bose Lane, Calcutta 3 for particulars regarding tailoring.

1941 N.V.R.B., Vizianagram—Bottles may be had of Anantakumar Ghose & Co., 9, Ezra St. and Bimal Bottle Stores, 130, Radha Bazar St., both of Calcutta. You may use citronella oil. Process of manufacturing fireworks will appear in an early issue of Industry. You may also consult Home Industries published from this office, price Rs. 3-7 including postage.

1945 M.M.S., Jamnagar—For acetone enquire of Calcutta Chemical Co., Ltd., 10, Bonfields Lane, Calcutta.

1946 H.Y.S.B., Halmuthur—You may consult Statesman, Chowringhee Square; Amrita Bazar Patrika, Bagbazar; Hindusthan Standard, Burman Street, Nation, Dacre's Lane, Ananda Bazar Patrika, Burman Street; Jugantar, Bagbazar and Dainik Basumati, Bow Bazar Street, all of Calcutta.

1948 D.R.B., Chaibasa—For soap making materials enquire of Calcutta Mineral Supply Co., Ltd., 31, Jackson Lane and Calcutta Tallow Supplying Co., 19, Tiretta Bazar Street; both of Calcutta.

1949 M.C.M., Sivakasi—We have got no such books. As regards book on timber you may write to Forest Research Institute, Dehra Dun.

1951 S.C.J., Nasirabad—Process of refining and bleaching vegetable oils will be found in Vegetable Oil Industry published from this office, price Rs. 3-7 including postage. Boots and shoes are manufactured from tanned leather and not from raw skins. So it will not be advisable to start a boot and shoe factory in your place where tanned leather is not available. You better start a tannery at your place. For soda stream and other machines enquire of Bottle and Essence Supply Agency, 11, Radha Bazar Street, Calcutta. Yes, you may start a steel trunk factory at your place. For machines write to Alfred Herbert (India), Ltd., 13-3, Strand Road, Calcutta.

REVIEW OF BOOKS

[illegible] FARMER. By S. R. Mavinkurve. [illegible] by Vora & Co., Ltd., Round Building, [illegible] Road, Bombay. Pages 32, price [illegible].

This is a pretty little brochure on the life and activities of the Indian Farmer, meant for the young folk. The entire narrative is clothed in a simple attractive language intelligible to our school students who have picked up as much English as is prescribed for the school leaving standard. Illustrations adorn the book all over and these will considerably enhance its worth and interest. Highly technical publications written by economists and experts on the problems of Indian agriculture abound in this country's literature. But they can hardly be expected to carve out for them any perceptible niche in the reading programme of the non-technical common reader. And yet it seems the need to-day that common readers ought to acquire some knowledge of the agricultural practices as they obtain in India and the defects that have beset our rural economy. The book under review, shorn as it is of the dry and rather heavy technicalities, will be an aid to the beginner for a preliminary initiation into the subject. India, real India lives in the villages. There is no doubt about that. And that is the main reason why all who want to know India, should make a study of her rural economy. The book under review popularises an important technical subject and discusses the problems of our agriculture, such as, how to secure increased yields of crops and liquidate evils like the peasant's poverty and indebtedness, almost with the ease and charm of story-telling. Mr. Mavinkurve takes into account all aspects of the peasant's life,—his present drawbacks and his future hopes. The book is comparable to Mr. Minoo Masani's now famous 'Our India' in point of style and mode of treatment and we wish it were included in the list of supplementary textbooks for our school children of Class IX or X.

LABOUR CODE. (Volume III. Part I). By Champaklal C. Bhatt and Chandrakant T. [illegible]. Published by Chandrakant Chimanlal Vora, Gandhi Road, Ahmedabad. Pages 176, price Rs. 12/8/-.

In the main, the book is a thorough legalistic study of the Indian Factories Act of 1948. The full text of the Act is given in it along with exhaustive commentaries and the latest case laws. Lawyers, labour officers, trade unionists and students of labour legislation will find the book well worth reading. In view of the wide provisions made in the new Act, for the regulation of their relations with their employees to secure the latter's safety and welfare within all [illegible] limitations, the industrialists in general will feel the need for a thorough acquaintance with it. The book under review, we trust, will serve that need admirably. An abstract of the Act of 1948 issued in a separate booklet along with the brochure will help readers get all essentials in a nutshell.

The book is rounded off with three Appendices, all of which have a unique importance of their own to the students of labour legislation. Appendix I, for example, gives all necessary details about the safety provisions of the 1948 Act. As employers are required to conform to these safety provisions, the authors have made it a point to discuss them without reservation. Appendix II is a statistical abstract relating to the number of workers employed in the various industries in India in 1948. There might have been certain changes in the figures supplied through the years succeeding, but the 1948 figures will help students gauge the extent of employment in the various industries. Appendix III summarises the criticism of the Act of 1948 made by the Indian Federation of Labour, when the Act was on the legislative anvil last year. The document certainly possesses a historical value which research workers in the field of labour legislation can hardly afford to ignore.

As for the provisions of the Act itself, it can hardly be denied that it is the first real Governmental attempt in India to protect the interests of labour and promote its welfare by legislation. In an admirably brief introduction covering a little less than a dozen pages, the authors give a historical review of labour legislation in this country and explain the main differences between the 1948 Act and the previous ones. The author's approach seems sufficiently critical to enable them to single out the defects also of the new Act.

THE INDIAN COTTON TEXTILE INDUSTRY (During Twentieth Century). By N. H. Thakkar. Published by Vora & Co., 3, Round Bldg., Kalbadevi Road, Bombay 2. Pages 276, price Rs. 15/-.

This masterly review of the Indian Cotton Industry with special reference to the two war periods in recent history brings into bold relief the problems peculiar to the industry and suggests remedies to help it on to its feet. Next to food and housing only, clothing is a big headache for the Indian people. Our cotton magnates have an important creative role to fulfil not only as employers and suppliers of domestic requirements but also as contributors to national prosperity by and through an appropriate development of the export trade in the Indian cotton manufacturers. The book under review is a happy blend of information, commentary and speculation on the future of our cotton industry, all in one.

The book gives a brief history of the development of the industry and explains how in the course of 3 decades India has emerged from a state of dependence on foreign textiles stuff to one of independence. Her exports of cloth to foreign markets show a steady increase through all these [illegible]

fillip to the progress of the Indian Cotton Textile Industry and the second world war gave a greater fillip still. The book contains statistical details regarding production, export as well as import of cotton goods like textiles, piecegoods and yarn in the two war periods, during which the financial structure of the industry was considerably strengthened. The cotton magnates no doubt made enormous profits during the war, but the main question confronting the industry to-day is, how far capable it may prove itself in the task of rationalization ahead of it in the post-war period. Among the difficulties in this connexion mentioned in the book under notice, reference may be made of the following:—A decline in the wartime profits with a lowering of the difference between raw cotton and cloth prices, while it will not be so easy to reduce the wage level; a substantial increase in the capital cost of replacement in comparison with the same during the period following the first world war; strain due to the existing taxation structure, which is heavy and growing heavier.

During the war years the nominal wages of workers in the textile factories underwent a perceptible increase, but that could hardly benefit them as the cost of living went up three-fold compared with that in the pre-war years. Labour Welfare Schemes too have not been tried successfully nor widely. The author is of the opinion "that after a lapse of 25 years, labour conditions have not improved as they should have."

The book contains an important chapter on the wartime problems of the cotton textile industry with special reference to scarcity of cloth and controls, and certain other difficulties that arose due to the transport, bottleneck, non-availability of coal, absence of imports of capital equipments, and the cutting off of the supplies of certain materials like dye-stuffs and chemicals. Speaking of the future of the industry the author refuses to do any amount of naive wishful thinking and concentrates on the multifarious obstacles that may retard its progress appreciably.

The later chapters deal with the organizational and technical aspects of the industry, the handloom industry, and the recent trends on the textiles front.

Discussing the post-partition trends, the author refers to the fact that due to the creation of Pakistan India has lost the best part of her fertile cotton tracts. The supplies of raw cotton thus are estimated to have been reduced by ten lakhs of bales approximately. The author also hints at the probable unwillingness of Pakistan to buy cotton manufactures from the Indian Union. Though, of course, Pakistan has not yet stopped buying her requirements from India, the fact has to be faced that she is in no mood to accord any preferential treatment to Indian goods. At the same time she is making all-out efforts to industrialise herself and in this task she will receive a great impetus from her indigenous resources of raw materials.

Apart from the probable loss of this potential market, Indian cotton manufacturing industry is now confronted by a multiplicity of handicaps like competition from rayon and other synthetic fibres, difficulties regarding the re-equipment of the industry, and the gradually deteriorating production position. The author discusses the nature of the crisis in the Indian cotton industry which is now perceptible to some extent and falls in line with most other spokesmen of the big business in suggesting that controls should be retained as emergency measures only but that the aim should be the restoration of the normal channels of distribution as soon as normal economic conditions are established in this country. The experiment of decontrol having failed miserably, the Government should make it a point to man its control organisation by efficient and honest persons. Otherwise controls will fail to serve their purpose of bringing down prices.

NOTICES & REVIEWS

(Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medical preparations and allied substances in this sections.)

CALENDAR

We have received one pictorial wall calendar from H. N Electricals, Engineers & Contractors, and dealers in electrical goods, 29A, Bentinck Street, Calcutta.

SNUFF

We are glad to receive from A.M. Madras Snuff Co., 1, Gafoor Sahib Street, Royapettah, Madras two sample phials of unscented snuff.

MILD STEEL MORTAR-PAN

We have received from Narappagari P. Anjaneyulum, Timmacherla P.O., Guntakal, M.S.M. Ry. one mild steel mortar-pan fitted with solid steel ring all round which is found to be strong, durable and serviceable.

MECHANICAL AND SPRINGED TOYS

We have the pleasure to recieve from Enamel & Industries Ltd, Trichur, one sample toy motor car set with spring We have examined the toy and found it satisfactory. We wish the concern every success in their new venture.

TRADE ENQUIRIES

(To communicate with any party write to him direct with name and address given below mentioning Industry).

1584, E. K. Roy & Sons, Pommalang, Cherrapunji, Assam—Want to be put in touch with the dealers in butterfly in Calcutta.

1762 West Bengal Rope Manufacturing Co., 84A, Netaji Subhas Road, Calcutta—Want to be put in touch with rope dealers at Singapore, Rangoon, Hongkong and Far East.

1813 The Golden Colour Industries, Bhadthana, E. I. Ry.—Want to be put in touch with the suppliers of bright liquid gold.

1849 K. R. Tandon, Jamuna Coal Trading Co., Farrukhabad—Wants to be put in touch with the suppliers of woven labels and plate tickets.

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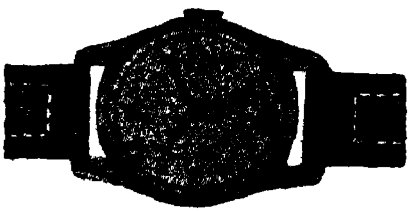
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